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CONTRACTOR'S METHODS ON CONCRETE SEWER

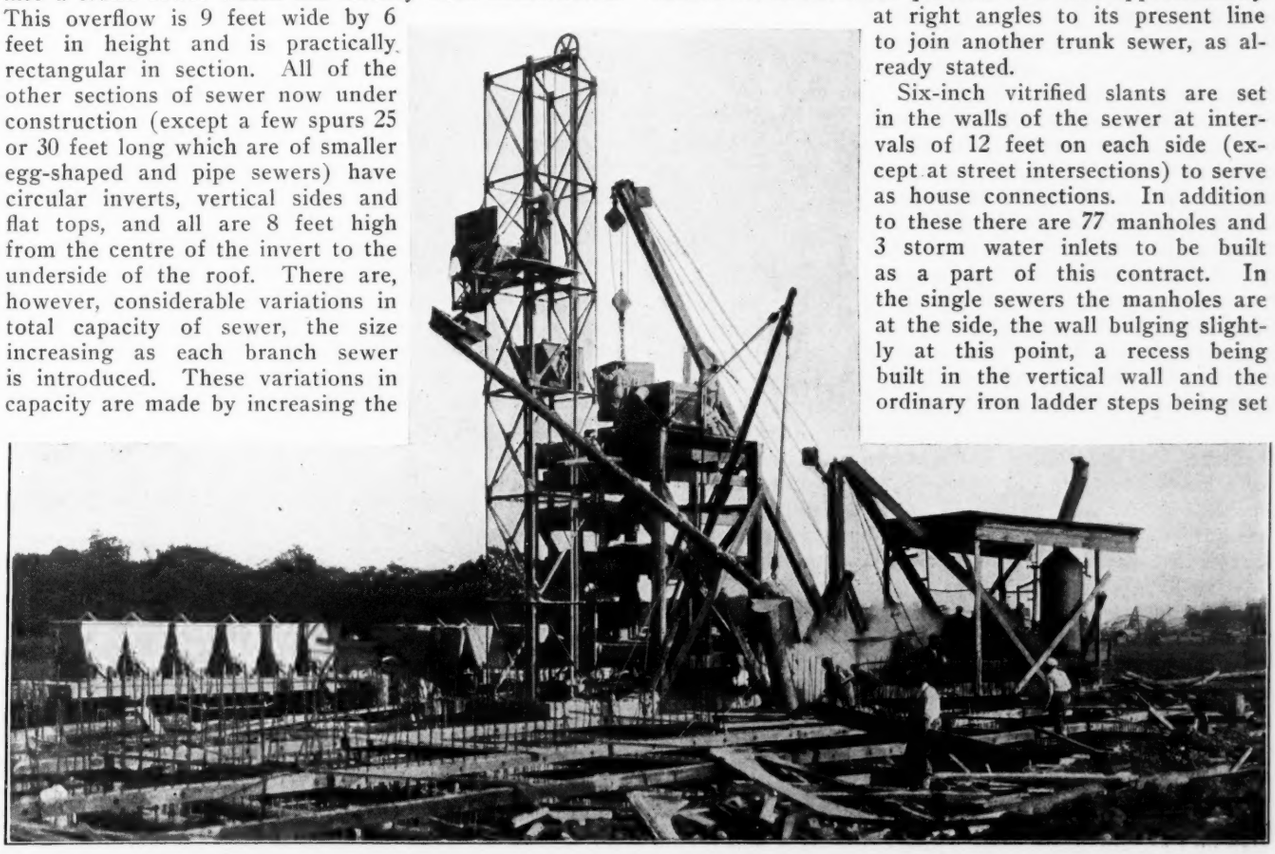
Maximum Economy in Handling Concrete Materials by Special Appliances and Methods—Concrete Mixing and Distributing Traveler—No Storage or Rehandling—Work for Wet or Dry Seasons.

Construction work is now progressing on a sewer which is unusually interesting because of both its magnitude and some of the methods employed by the contractor. This sewer is being constructed at Classon Point, in the Borough of The Bronx, New York City, by Rogers and Hagerty as contractors. Some idea of the magnitude of the work may be obtained from the fact that one monthly estimate amounted to about $80,000—said to be the largest monthly estimate ever paid out by The Bronx Sewer Department.

This sewer is for carrying house sewage and storm water combined; but at a point about a quarter of a mile from the Bronx River there is an overflow weir, from which point an overflow sewer 1,300 feet long carries excess storm water to the river, while the balance of the sewage and all of the dry weather flow will be carried through about a mile more of new sewer and discharged into a trunk sewer which has already been constructed. This overflow is 9 feet wide by 6 feet in height and is practically rectangular in section. All of the other sections of sewer now under construction (except a few spurs 25 or 30 feet long which are of smaller egg-shaped and pipe sewers) have circular inverts, vertical sides and flat tops, and all are 8 feet high from the centre of the invert to the underside of the roof. There are, however, considerable variations in total capacity of sewer, the size increasing as each branch sewer is introduced. These variations in capacity are made by increasing the width of the sewer, the height remaining constant. The versed sine of the arc of the invert is a constant also, being 18 inches in every case, the radius being varied to suit the several widths of sewer. At the lower end the desired capacity is secured by constructing a double sewer.

At the upper end of the contract is 1,100 feet of sewer 7 feet wide, and then follow in succession 850 feet of sewer 9 feet 6 inches wide, 750 feet 10 feet wide, 75 feet of 11-foot 6-inch sewer, 320 feet of 12-foot, 790 feet of 12-foot 6 inch, 830 feet of double sewer each 8 feet 3 inches wide, 60 feet of double 8-foot 6-inch, 720 feet of double 8-foot 9-inch, 2,388 feet of double 10-foot sewer and 100 feet of 11-foot 3-inch sewer. At the present time a brick bulkhead is built in the last named stretch of sewer, and all sewage will for the time being pass out through the overflow, but later the main sewer will be carried for about three-quarters of a mile approximately at right angles to its present line to join another trunk sewer, as already stated.

Six-inch vitrified slants are set in the walls of the sewer at intervals of 12 feet on each side (except at street intersections) to serve as house connections. In addition to these there are 77 manholes and 3 storm water inlets to be built as a part of this contract. In the single sewers the manholes are at the side, the wall bulging slightly at this point, a recess being built in the vertical wall and the ordinary iron ladder steps being set

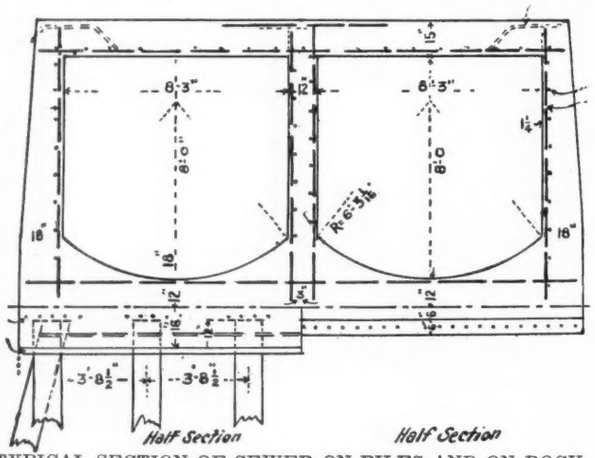


CONSTRUCTION WORK ON THE CLASSON POINT SEWER.
Cement buckets on flat cars in background. Concreting traveler in center. Side reinforcing rods of sewer in foreground.

into the concrete in this recess. In the double sewers the manhole is placed in the centre, the centre wall being omitted directly under the manhole opening and the steps being built into the end of the center wall at this break in its continuity.

The line of the sewer is across land, a large part of which was originally swamp, and about half of which is still in that condition. One stretch of a thousand feet or so consists of made land to a depth of 10 to 20 feet, the material used for fill consisting of ashes, dirt, tin and other materials ordinarily found in city fills. At two places on the line are found elevations of 15 or 20 feet of natural soil and which contain rock which will require blasting for the excavation of the sewer trench. In the swampy sections, or wherever the engineer decides that the bottom requires it, piles have been driven to support the sewer.

The accompanying illustration of a double 8-foot 3-inch sewer will serve to illustrate all of the sections. In all cases the partition walls are 12 inches thick and the side walls are 18 inches thick at the junction with the invert and 12 inches thick at the top. The inverts also are uniformly 12 inches thick at the thinnest point above the concrete foundation floor. As stated before, the versed sine of the invert is in all cases 18 inches, but the radius of the invert varies with the width of the sewer. The only variable is in the roof, the thickness



TYPICAL SECTION OF SEWER ON PILES AND ON ROCK.

and reinforcement of which vary with the span. The reinforcing bars in the invert also vary in thickness between ¾ of an inch and 1¼ inches. They are placed 2 inches below the invert surface, extending at right angles to the line of the sewer, at 8-inch intervals. The vertical side reinforcing rods are of ¾-inch steel, 8 inches between centres. The longitudinal reinforcement consists of ½-inch bars, spaced 12 inches between centres. In the centre wall the reinforcement consists of a line of vertical and another of horizontal reinforcement, 1 inch from each face of the wall, the vertical reinforcement consisting of ½-inch bars spaced 8 inches between centres and the horizontal reinforcement of ⅜-inch bars, 12 inches between centres. The roof varies in thickness from 15 inches to 23 inches, and is reinforced by longitudinal bars, ½ inch thick and 12 inches between centres, placed 2 inches inside the lower face of the roof slab; also transverse bars at the same distance from the lower face, spaced 8 inches between centres and varying in thickness according to the span; also short transverse bars with their centres at the centre of the division wall and having a length of 6 feet or more, placed 2 inches from the top surface of the roof slab and at 8-inch intervals. Every alternate reinforcing bar on the lower side of the roof slab is turned up near each end to within two inches of the top surface, the intermediate ones being continued straight through the side walls to within 2 inches of their outer faces.

Where the ground does not require piles, the foundation consists of 12 inches of concrete, reinforced with longitudinal ⅝-inch bars spaced 6 inches between centres. Where piles are used, these are cut off 18 inches below the invert of the sewer and a foundation or floor of concrete is constructed two feet thick, extending for 6 inches above the tops of the piles and extending as a monolith from side to side of the trench and continuously lengthwise. The piles are placed in bents 4 feet apart longitudinally, the piles in each bent being 3 feet to 4 feet apart, depending upon the width of the sewer. Halfway between the outer ends of successive bents is placed a single batter pile, pointing outward with a batter of 3 inches to one foot, to serve as braces to prevent side movement of the foundation. The concrete floor is reinforced by ⅝-inch longitudinal rods spaced 6 inches apart, there being five rods over each outside pile and four over each of the intermediate piles. Two ¾-inch bars are carried transversely between each pair of batter piles to keep these from spreading at the tops, either during or after construction. The concrete flooring rests upon a floor of 2-inch planks, which in turn rests upon cross-pieces spiked to the piles. In some cases these piles extend down to a depth of 60 to 75 feet, but the majority of them are approximately 30 feet long, while a few at the edges of the swampy places do not extend down more than 10 feet.

CONTRACTOR'S METHODS AND EQUIPMENT.

Work on this contract was begun early in the summer and concreting began on August 1. Up to the present time about 3,000 feet of sewer has been completed, practically all of the piles have been driven, and several hundred feet of concrete foundation and of invert have been constructed in addition to the completed sewer.

In beginning the work the contractor realized that the work would require more than one season, and that the summer season would be much the most favorable for construction work in the swampy sections. (During some high tides the water sets up so high in the swamp as to cover the ground near the sewer and the construction track to a depth of a foot or more.) The contractor therefore decided to begin by constructing first the sections of sewer on low land, especially those nearest the water, doing no work on the sections requiring deep excavation until late fall or winter. Another reason for this plan of operation was that the contract required that the sewers which were above ground be covered with earth to a depth of 4 feet on top, the top of this fill extending for 3 feet beyond the outer edges of the sewer and having slopes of 1 to 1 on each side, these slopes being rip-rapped at the bottom to prevent wash by the tide; and the material for this fill could best be obtained from the excavation of the trench in the higher ground.

The first construction operation was the driving of the piles, which was begun at the outlet and continued inland up to the first stretch of hard bottom. Here the pile-driving apparatus was dismantled and carried on cars on the construction track (to be referred to later) to where the pile foundation again began, where it was reassembled and the pile driving continued.

The pile driver used throughout the work was an Arnott steam hammer driver. The guides, which are about 50 feet high, are hinged at the top to a tower, so that they can be swung out of the vertical in order to drive the batter piles. A platform carries these guides and the supporting tower and the engine and drums used for raising the piles and supplying steam for the driver. This platform travels on a track laid with a rail on each side of the trench, the platform spanning the trench. In

driving the piles the platform was set with its front edge immediately over the position for the next bent of piles; the end pile of the bent was driven, then the other bearing piles in succession across the bent to the other side. The platform was then removed 2 feet longitudinally along the trench, the two batter piles at that point driven, then moved 2 feet further where the next bent of piles was driven, and so on. The best day's work was 120 piles driven in eight hours, an average of a pile every four minutes.

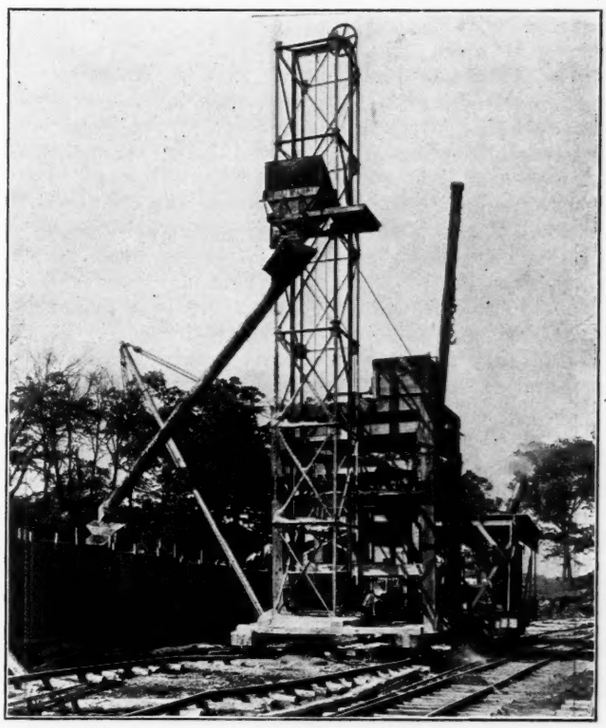
Following the pile driving, the sewer was constructed at the outlet end and in an intermediate stretch 900 feet in length, the latter of which has been completed, and the former is perhaps two-thirds done. Concrete work has also been begun about a mile from the outlet. Concreting probably will not be continued very much longer, but will be shut down during the cold weather. It is expected that work will begin this week on excavating the trench through the higher land, for which purpose a Marion steam shovel, model 60, 2½ yards capacity, is to be used.

The contractor at the outset built a dock near the outlet of the sewer, which he uses in bringing all of his materials by water up the East and Bronx rivers. At this dock he has a stiff-leg derrick with the necessary engine and boiler and hoist, all mounted on piles at the edge of the river. He also has two stiff-leg derricks mounted on scows which can be used either at the dock or elsewhere as needed. Two lines of construction track run the length of the dock and unite into a single line which extends throughout the entire length of the work —9,100 feet. There are also, mounted on the dock, elevated bins for sand and gravel used in the concrete, and a spur from the track runs under these bins. The gravel and sand are brought fro mCow's Bay, both materials being loaded on one scow in the proportions required for the concrete, so that no material has to be stored on the dock or on land but is taken directly from the scow in buckets by the derrick, placed in the small bins above referred to (which have a capacity of only a few cubic yards) measured automatically and discharged from these into buckets and hauled directly to the work. As the contractor owns his own scows, this affords a very convenient and cheap method of transporting and handling the material, which may be described as follows:

The concrete is mixed in proportions of one cement, 2½ sand and 5 gravel passing a ¾-inch screen. Bottom dump buckets, made by G. L. Stuebner Iron Works, of Long Island City, are placed six on a flat car, two cars or twelve buckets composing a train, which is hauled by a locomotive built by the Vulcan Iron Works, of Wilkes-Barre. This train is backed under the small bins until the first bucket is under the gravel bin, when sufficient gravel is admitted into it to make one batch. This bucket is then moved under the sand bin and receives sufficient sand for a batch, the second bucket at the same time being under the gravel bin and receiving its portion of gravel. The cement required for this batch is placed on top of the sand, and when the buckets on the train have all been filled each contains the ingredients required for a batch of 0.8 of a cubic yard. Meantime the stiff-leg derrick has been replenishing the small gravel and sand bins from the scow alongside the dock, and this continues until the scow is empty, when another takes its place.

The trainload of 12 buckets is then hauled by locomotive to the point where the concrete is to be used. Here again the method adopted is out of the ordinary. A platform which travels on a very broad gauge track carries a steam boiler, stiff-leg derrick and three-drum hoist, a Hains gravity mixer with its supporting tower, and beyond this a steel tower about 40 feet high which is used for discharging the concrete through a chute into the sewer trench. The ingredients for the concrete having already been measured into the buckets, a bucket is raised by the derrick and discharged by the bottom dump into the hopper of the concrete mixer. It passes through this by gravity and out of a spout at the bottom into a bucket which rests upon the ground at the bottom of the tower.

The concrete, now mixed, is raised in this bucket and automatically dumped into a hopper which can be attached at one of three or four elevations on the tower, passes from this hopper (the outlet of which is controlled by an operator standing on a platform at this point) into the upper or hopper end of a section of U-shaped chute. At the end of this section is another section of chute fastened to the first by a swivel joint and which can accordingly be so moved as to discharge the concrete at any desired point within a radius of several feet. The swivel joint is supported by block and fall from a boom, the foot of which rests on the platform at the foot of the steel tower. The entire outfit and the platform upon which it rests is moved from time to time as necessary. This is accomplished by a steel cable fastened ahead to a "dead man" and wound upon one of the drums of the hoist. The shifting of the apparatus requires only five or ten minutes, the track being laid ahead by the general helpers in the gang at such times as may be convenient. The tower erected on the front end of the traveler and the automatic dumping bucket which works inside of the tower are those known as the Lakewood, manufactured by the Ohio Ceramic Engineering Company, the New York agents for which are Brown & Sites Company, who designed the outfit carried by this traveler.



CONCRETE TRAVELER.
Forms for sewer side and roof in left background.
Construction track at the right.

One of the results of this method of handling the concrete is that no part of the work is cluttered up with wheelbarrow runs, concrete mixers, piles of sand and gravel, etc., but all the work is straight ahead, systematic, and practically no time is lost in shifting machinery of

any kind. Great economy must result from the fact that the material is not handled by hand or wheelbarrow at any point from gravel bank to finished sewer, except the spreading of the concrete as it is spouted into the invert.

Two of the concrete outfits are used, but only one is in operation at a time. The concrete gang lays a considerable length of invert; then, while this is setting and while carpenters are erecting the forms for the sides and roof, the same gang goes to the other concrete outfit (which may be half a mile away) and lays other invert (or sides and top, as the case may be) at the second location. This is figured to be more economical than endeavoring to move the entire outfit from one point to the other, as the entire concrete gang can be moved by the construction train from one plant to the other with a loss of not more than fifteen minutes' time.

As stated before, the construction track is carried the entire length of the work, and thus the buckets containing concrete materials can be carried directly to either plant. The track is also used for delivering piles, lumber for forms, reinforcing bars and all other materials and appliances required on any part of the work.

In constructing the invert, wooden invert profiles are set at 15-foot intervals, the concrete is deposited in alternate sections between these, and the top surface struck off with a straight edge. As soon as this has set sufficiently the profile boards are removed and the remaining sections of the invert are filled and struck off with a straight edge, using the previously constructed sections as guides. At the same time that the invert is constructed the side walls are carried up to a height of 6 inches, 2-inch plank forms for this being set in position at the same time that the invert profiles are set. This is found to secure a much straighter alignment of the walls and with less labor than if the invert only were constructed. Strips of wood, approximately triangular in section, are set into the top surface of the 6 inches of wall and later removed, to provide a bond between the old and new concrete. When the invert concrete is sufficiently set, it is covered with one inch of cement mortar, which is troweled down to a very smooth surface. Reinforcing rods for the side walls are set in position before any of the invert concrete is poured, and are held firmly in position, as shown in the illustration upon the first page of this article, a pair of 2-inch planks being used, with grooves gouged out at 8-inch intervals, the planks being so placed that these grooves come opposite each other and contain the reinforcing rods. The planks are bolted together and carefully aligned and the reinforcing rods are thus held rigidly in their proper positions.

The forms for the sides and top are constructed of planks and 4x6's, the construction being very simple, as both side walls and roof are plane surfaces. These are set up by carpenters and braced to the sides of the trench or adjacent ground.

As soon as the invert concrete is placed it is covered with sand or other material to prevent rapid drying. The sides and roof are poured at one operation. As soon as the roof concrete has been completed it is covered with earth from the excavation to a depth of 6 inches to prevent the roof, which receives the sun all day long, from drying more rapidly than the sides, each of which receives the sun but half of the day. This dirt is left on the roof permanently, as the whole sewer is later to be covered with an earth embankment.

The excavation in the swampy land was very slight and consisted merely of the sod and top muck which was thrown out by hand. In the deeper excavation in the made ground, which is now going on, clam shell buckets, made by the Hayward Company, are used, operated by a Brown hoisting machine. These buckets take the soil in its natural state and no labor is required in the trench except to trim the sides and throw the soil toward the centre, and to set and drive the sheeting. Two of these excavators and clam shell buckets are being used.

As might be imagined, abundance of water is being met with but has given no serious difficulty. No underdrain is used but the water is removed at the site of the work by pumps and discharged into ditches which carry it to an adjacent swamp or to the river. Several Cameron steam pumps with 8-inch suction and 6-inch discharge are used for the more permanent pumping stations, while at other points the contractor is using steam syphons, pulsometers and centrifugal pumps manufactured by the Morris Iron Works.

The water is, of course, necessarily kept down while the piles are being sawed off at the proper elevation and while the platform is being built to receive the concrete. It is not considered necessary, however, to make special efforts to keep the trench dry while concrete is being deposited, as there is no flow of water through the trench which would wash out the cement. Water, of course, is not allowed to flow over new invert until it has thoroughly set, but where there is any danger of this the trench in front of the invert construction is kept pumped down by one of the pumps previously mentioned.

Altogether the general handling of the work and material seems to be excellently adapted to economy and the avoidance of all confusion and loss of energy. Cement is brought in a boat, adapted for the purpose, directly from the yards at Jersey City to the contractor's dock and from here is placed directly into the concrete buckets, there being thus but one handling. Similarly, the sand and gravel are brought directly from the point where they are excavated and screened to the dock with but one handling—that of loading it on to the scows, and one more handling places it in the concrete buckets. There is no handling of either by wheelbarrows or in any other way except by the derrick which removes it from the scows to the bins. Two locomotives and the derrick and hoist on the concrete traveler do all the remaining work of transporting, mixing and finally depositing the concrete in place.

In excavating, also, the material is being handled but once, and that by the clam shell bucket and Brown hoist, which deposits it in dump cars which travel on the construction track, by which it is dumped directly into its final position. When the steam shovel begins work, within a few days, it is intended to lay the track carrying the dump cars directly on the top of the sewer and dump the material excavated this winter to form the embankment over the sewer in the swamp land which has already been constructed.

The plant includes 2 Vulcan Iron Works locomotives; 8 Continental cars; 12 4-yard, 2-way dump cars, manufactured by the Western Wheeled Scraper Company; 24 Stuebner bottom dump concrete buckets; a Marion steam shovel; 2 Brown hoists; 3 traveling derricks; one 75-foot guy derrick; a stiff-leg derrick at the dock; 2 derrick boats; a cement boat; scows for bringing sand and gravel; 2 travelers carrying the complete concrete mixers and delivering outfit already described.

The general superintendent of this work is P. W. Rogers. The engineer in charge for the city is Geo. L. Christian, and the inspector is Julian Wood.

AIR DRILLS FOR SEWER CONSTRUCTION.

The superintendent of sewers of Worcester, Mass., Matthew Gault, in his latest report states that it is his aim to keep at a high degree of efficiency the equipment owned by the department and used in sewer construction and maintenance, and to add to it from time to time

new labor saving tools and machinery. Following out this idea, in 1912 a new blacksmith shop was built and supplied with modern equipment, and a complete new outfit was purchased for rock excavation. The forges are supplied with power blast. A 100-pound Fairbanks power hammer has proved very useful, as has also a Leyner drill sharpener which has a capacity of from 50 to 100 rock drills per hour. It is operated by compressed air furnished by a 9x8-inch Ingersoll-Rand compressor, which in turn is operated by a 20 horse-power electric motor.

For rock work, especially in trenches, an 8x8-inch Ingersoll-Rand air compressor geared to a 15 horse-power gasoline engine, both mounted upon trucks, has been purchased. They furnish sufficient power to operate two hand hammer drills using hexogonal hollow steel. This plant is portable and can be moved easily from place to place, and Mr. Gault says: "We are conservative when we say that for our work in narrow trenches this outfit has reduced by one-half the cost of drilling, as compared with the cost of steam drilling."

ROCHESTER'S SEWAGE DISPOSAL

Detritus Tanks, Fine Screens, Imhoff Tanks and Sludge Beds—Fall in Outfall Pipe Utilized for Power and Light at Plant.

The improved plans for disposing of the sewage of Rochester, N. Y., really date from the year 1887, when the council employed Emil Kuichling to prepare plans for an east side belt line sewer, which sewer, although discharging into the river, was built with a view to carrying the sewage at a later date to a disposal plant between the city and Lake Ontario on the north. Between 1899 and 1902 several damage suits for pollution of the river were begun, only one of which went to trial and was settled. During the early part of 1907 a committee consisting of George H. Benzenburg, Rudolph Hering and Emil Kuichling formally approved of a report submitted by Mr. Kuichling as the result of investigations conducted between 1904 and 1907. No immediate action was taken upon this report, but plans were finally prepared and submitted to the State Commissioner of Health on February 26, 1910. In these plans were embodied the principles deduced from the investigations of Mr. Kuichling on the clarification of sewage, an abstract of which was published in our issue of June 1,1910. These plans provided for three distinct steps:

"1. The removal of the great bulk of mineral matter and the comparatively inoffensive inorganic matter in the detritus tanks as originally contemplated.

2. The removal of the coarse floating and suspended matter, which is largely stable organic substance such as paper, rags, leaves, wood, hair, etc., by means of screens having meshes or interstices of about one-eighth inch in size.

"3. The removal of most of the remaining finely divided matter, mainly of organic nature, by sedimentation in suitable large tanks."

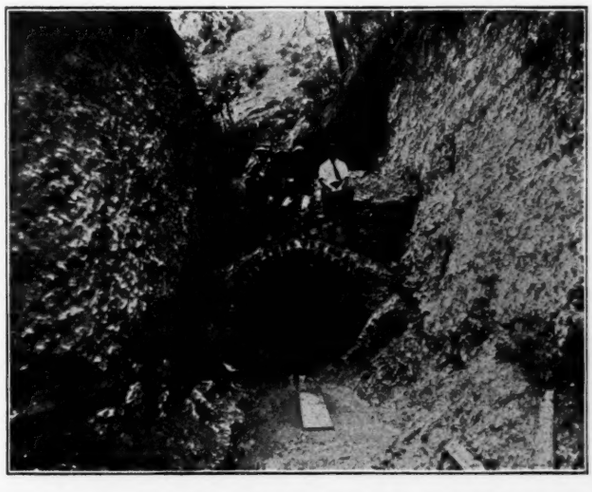
Health Commissioner Porter, realizing the importance of this proposition, both because of the size of the city and because this method of clarifying only was somewhat unusual in the state, submitted the plans to three leading sanitary experts; and, on the basis of their reports, asked to have the plans modified by providing twice the capacity of settling tanks which was shown on the original plan, and also providing for three openings into the lake at the end of the outlet (which extends 7,000 feet from the shore into 35 feet depth of water) and provision for extending the outlet still further at some future time if it should be desired. These changes were made and resubmitted and approved on September 22, 1910. In November of that year $500,000 was appropriated for the work, which was increased by one million dollars additional in March, 1912.

Meantime studies upon the sewage disposal plant had been continued, and George C. Whipple last year reported upon the same. (See Municipal Journal for January 9, 1913.) It was then decided to substitute Imhoff tanks for plain sedimentation tanks and also to provide for disinfecting the effluent.

This project is of unusual interest because of the magnitude of the work involved and also because of the unusual amount of study which has been given to the disposal plans by six or eight of the leading sanitary engineers of the country. The work consists of the sewage disposal plant proper, a long intercepting sewer bringing the sewage to the plant, which is about three and one-half miles north of the northern boundary of the city, and the outlet from the plant which has a total length of about two miles.

The design of the interceptor and plant is based upon a future population of 400,000, of which 10,000 is in a territory which cannot be drained to the main plant, and for which a small individual plant will be provided. Provision is made for a future dry weather flow from the larger area of 120 gallons per capita, and for a storm water flow of two and a half times as much additional. This basis was used in designing all sewers of the combined system, which is that found in all the territory now contributory to the existing outlet sewers. In the territory north of the city which has not yet been sewered, however, the separate system will be used and the house sewers only will be connected to this intercepting sewer; 175 gallons per capita being provided for this territory. This gives a total dry weather flow of approximately 55,500,000 gallons daily and a storm water flow of 173,000,000 gallons daily.

At present all sewers, except those in the small district which is in another drainage area, discharge into the Genesee river. The interceptor was designed to collect the dry weather sewage and part of the storm water from all the existing sewers as near to their outlets as possible, the existing outlets being retained as overflow outlets to carry the surplus storm water whenever it shall exceed two and a half times the dry weather flow. This interceptor flows nearly due north, following close to the river, first crossing from the east to the west bank, along this, then across the river and along the east bank, until it has passed about a mile beyond the city limits, when it deflects slightly toward the east so as to reach a desirable site for the sewage disposal plant

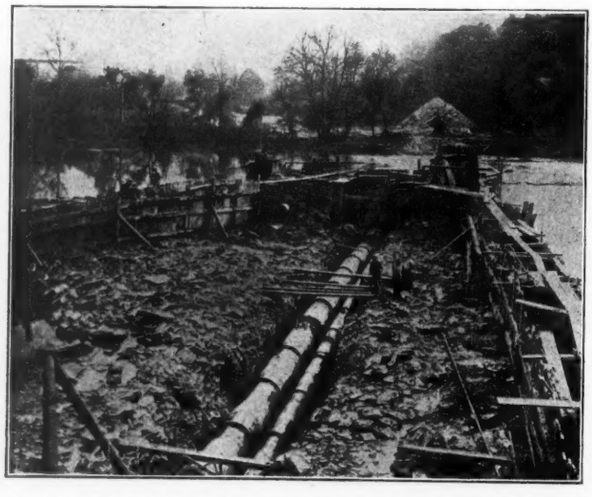


PORTAL OF SIX-FOOT SEWER IN TUNNEL.

and outlet. In addition to these two crossings of the river with the main interceptor, there are two other crossings for bringing to this the sewage from the opposite side of the river.

In order to control the flow of storm water so that the desired amount shall pass into the interceptor and the surplus through the outlets into the river, chambers are constructed in which regulating devices are installed that will automatically maintain the required volume of discharge. These will be operated by a float located in a small chamber in which the water will rise and fall as the volume entering the chamber is in excess of or less than the volume discharging, the float operating a shutter which closes the inlet as the water rises or opens it as it falls. The discharge from the chamber is fixed by the size of the opening and a given head, the regulating device being so adjusted that the float will begin to close the shutter when this given head is reached. In order to provide for increasing discharge of storm water as the amount of house sewage increases from year to year, the size of the opening from the chamber will be enlarged at intervals in order to give the area required to produce the discharge desired under the given head.

The interceptor begins by a tunnel crossing under the river and having a diameter of 8 feet; the sewage, however, being confined to a semi-circular channel 3 feet wide, on each side of which is a bench wall 2½ feet wide which carries a water main under the river. The tunnel then changes to 6 feet diameter, which extends for 5,128 feet in tunnel with a brick invert. There then follow in succession 3,438 feet of two lines of cast iron pipe laid in open trench as a siphon under the river, one line having a diameter of 2 feet and the other of 3 feet 6 inches; 3,042 feet of 6-inch sewer in tunnel with brick invert and 328 feet of the same size in open trench, formed of concrete with brick lining; 2,377 feet of 6-foot 6 inches, 2,180 feet of 6-foot, 5,620 feet of 8-foot, 3,600 feet of 7-foot, 3,600 feet of 6-foot 3 inches, 3,200 feet of 6-foot 9 inches, 2,000 feet of 5-foot 6 inches and 800 feet of 6-foot 3 inches, all in open trench and constructed of concrete with a brick lining. This brings the interceptor to the sewage disposal plant. The outlet of this consists of 2,347 feet of 5-foot 6-inch steel pipe in open trench, and 6,963 feet of the same pipe submerged in the lake bottom. The various sizes are governed not only by the increasing amount of sewage received by the interceptor, but by the grades, it being noticed that in certain cases the size decreases rather than increasing, this being on account of the steeper grades called for by the surface contour.



CONSTRUCTING 42-INCH AND 24-INCH SIPHONS ACROSS GENESEE RIVER.

The siphon near the upper end consists of 24-inch cast iron pipe for the dry weather flow and 42-inch for the storm flow. For the protection of these pipes a grit chamber is constructed at the portal of the tunnel to intercept any large floating articles, stones, gravel, etc., which may clog the siphon. This chamber consists of three channels, a central one for the storm water flow and two outer ones for the dry weather flow; only one of the latter, however, being in use at a time in order to permit cleaning them. Each channel has a gate at its entrance to control the flow, and the two outer ones have gates at the outlet end to prevent either channel flooding the other, since both of these channels discharge into the same siphon. At the entrance to the storm water channel is a weir set at such a height as to divert the sewage to the side channels during dry weather flow, but permit the surplus to pass into the large storm water pipe when the two and a half volumes are exceeded. An overflow pipe leads to the river which may receive all of the sewage should the siphon become clogged, but is intended for such emergency only. These siphons act under a head or a fall in gradient of approximately 15 feet. Only a part of this length of 3,438 feet is in the river bed proper, but that portion which is in the river channel is encased in concrete. There are 20-inch manholes on each pipe on each side of the river, and blow-offs on the further side discharging at the level of mean low water. The other river crossings also are constructed of cast iron pipes with grit chambers, in general accordance with the plan just described.

The disposal plant is about one-half mile south of the shore of Lake Ontario, the city having purchased here 291.5 acres. The plans as finally adopted provide for detritus tanks having both fine and coarse screens, and sedimentation tanks of the Imhoff type. Also sludge-drying beds for receiving the sludge from these tanks. A power plant will be constructed for utilizing the head available in the effluent from the tanks, which will furnish power to light and operate the plant.

The detritus tanks, which receive the flow directly from the sewer, are three in number, only two of which are being constructed at present, however, and only one of these will operate at a time, permitting the other to be cleaned out. These are intended to receive the dry weather flow only, the surplus passing directly to the sedimentation tanks through by-pass channels which it enters by flowing over weirs, so that the heavier suspended matter will be washed into the detritus tanks as during dry weather flow. Coarse racks with 2-inch openings are placed at the upper ends of the tanks and at the entrances to the by-pass channels. These racks will be cleaned by hand by use of rakes. The tanks have an effective length of 58 feet and a top width of 17 feet. The sides are vertical to within 7 feet of the bottom, from where they slope at an angle of 45 degrees, making the bottom width 3 feet. The bottom also has a longitudinal slope and is 3 feet lower at the entrance than at the outlet end, the depth being 14 feet at the latter. At the lowest part of the tank is a drain pipe, controlled by a horizontal gate operated from a platform above, for drawing off the water during cleaning, this drain discharging into a well from which the water can be returned to the tanks by pumping. For removing the sediment from the detritus tanks a power-driving excavating apparatus will be used which can be moved from one tank to another.

Fine screens will be placed at the ends of these tanks, these screens having small openings and being mechanically cleaned.

The flow into the tanks is controlled by weirs at the outlet end of each, so that when the flow from one tank exceeds 50 cubic feet per second, another tank will re-

ceive the surplus. The storm water flow will be controlled by the backwater in the channel leading from the detritus tanks to the Imhoff tanks. Up to a flow of 75 cubic feet per second the weirs at the outlet of the detritus tanks will have a free overflow, but as the flow increases above this amount the weirs will become submerged, and to maintain the same discharge the water surface in the tanks will rise and begin to overflow into the by-pass channels. For a uniform flow greater than 75 cubic feet per second, the water surfaces will adjust themselves to maintain a flow of approximately 50 cubic feet per second over the weir when one tank is in operation and 37.5 cubic feet per second when two are in operation, the surplus passing into the by-pass channels. The dimensions of the by-pass channels are planned so that, with the maximum depth of backwater in the channel to the Imhoff tanks and with the two tanks in operation, the by-passes will carry the maximum quantity in excess of 75 cubic feet with such a depth of water as will give a submergence of the weir capable of passing 37.5 cubic feet over each weir, or in other words, for the maximum flow the water surface in the tanks will be higher than the surface of the backwater from the Imhoff tanks, by an amount equal to the head required to pass 37.5 cubic feet per second over each weir. The water surface in the tanks will vary in height 1.3 feet between maximum and minimum flow, and the velocity will vary from 3½ inches per second to 5 inches per second.

From the detritus tanks the flow will pass to the Imhoff tanks, of which 20 units of three tanks each are to be provided for the total 400,000 population. These are placed symmetrically, 10 on each side of the central influent and effluent channels, two units being placed together with a space for a driveway between successive pairs.

Each unit will consist of three cylindrical wells having an inside diameter of 35 feet and a depth of 41.4 feet from the top of the wall to the inside of the conical bottom. The cylindrical walls are 2½ feet thick, and the wells are so spaced that the walls of one join to the next so as to make the division wall between wells 2½ feet thick on the centre line of the tanks. This gives a total inside length of one unit of 110 feet. The upper or settling chamber of each unit is divided into two channels, each 10 feet wide and 12 feet deep from the water surface to the 6-inch slot at the bottom through which the matter which settles out enters the lower or sludge chamber. The bottoms of the settling chamber are constructed of inclined concrete slabs 5 inches thick and sloping at an angle of 1 horizontal to 1½ vertical. The two channels are parallel, with a space 3 feet wide between them connecting with the sludge chamber, which allows an opening for the escape of gas. The sludge chambers are 16 feet deep from the bottom of the channels to the bottom of the cylindrical section, with 8 feet additional in the conical bottom. Each unit is designed to handle the sewage from 20,000 persons, or a dry weather flow of 3.75 cubic feet per second, and a storm flow of 13.125 cubic feet per second; the storm flow passing through the same tanks as the dry weather flow, raising the water surface slightly and increasing the velocity through the tank. The velocities in the channels or settling chamber will be .022 foot per second and .07 foot per second respectively, and the period of sedimentation or time of passage through the chamber will be 75 minutes and 24 minutes respectively. The capacities of the sludge chambers are designed to provide for a storage of 120 days, this being the probable maximum duration of cold weather during which the sludge cannot be removed. It is estimated that the sludge during this period will amount to 2 cubic feet per capita.

The effluent from the detritus tanks will be carried in two influent channels running the entire length of the group of Imhoff tanks. These channels will have a level bottom and be 7 feet wide opposite the first unit, decreasing in width 6 inches as each successive unit is passed, and having a minimum width of 2½ feet opposite the last unit. The desired flow for each unit will be diverted from these channels through an opening controlled by a gate, which will be operated automatically by a float in the influent channel so as to give each unit its proportionate amount of the total flow. From each of these openings a channel 2½ feet wide carries the sewage to its respective unit, this influent channel being continued around the outside of the tanks so that the sewage can be admitted from either end and the flow be reversed at intervals. This channel becomes the effluent channel when the sewage is entering at the near end of the unit. The entrance channels are all level and the entrance weirs are all at the same elevation.

From the tanks the flow will pass to the main effluent channels, of which there is one on each side of the influent channels and parallel to them but at a lower level. The main effluent channels are divided into two smaller channels by a partition wall which acts as a weir, the flow entering the smaller of these channels, which is designed to carry the normal dry weather flow, and the surplus overflowing into the other channel. These two channels are 2 feet and 4 feet wide respectively opposite the first unit, and 3 feet and 6 feet wide opposite the last unit, and have a grade toward the outlet. At the ends of the effluent channels, pipes connected with the dry weather flow channels convey this flow to the power plant, while other pipes connected to the overflow or storm water channels, carry the volume in excess of the dry weather flow to an outlet which discharges into the lake.

The sludge is drawn from the bottom of the Imhoff tanks through pipes which discharge into a channel about 5 feet lower than the water surface in the tanks, giving this amount of head for forcing the sludge out through the pipe. A sludge channel is located between the two units of each pair, and conveys the sludge from these six tanks to a drying bed located opposite this unit. The sludge beds are designed of such area as to provide one square foot for every three persons, the area for each unit therefore being 6,666 square feet, and the total area for all the tanks being a little over three acres. The beds are lined with 1 foot 7 inches of filtering material, composed of 2 inches of fine sand, 3 inches of coarse sand, 8 inches of coarse sand and gravel, and 6

OUTLET FROM DISPOSAL PLANT TO LAKE.

inches of broken stone. They are underdrained with 4-inch tile spaced 8 feet apart. The beds are divided into 36-foot by 50-foot sections, and running lengthwise of the plant, between sections, will be depressed tracks on which will run dump cars for removing the dried sludge. This sludge will be used for filling in deep valleys and low places on the city property adjacent to the plant.

The power plant is located some distance north of the Imhoff tanks on an elevation which will give a head capable of producing 100 horse-power when the dry weather flow is used. The pipe from the effluent channels will act as a penstock, discharging through the turbine, the draft tube of which will connect with the main outlet pipe. Two turbines with generators and electrical equipment will be installed, each acting upon the unit principle. During storm flow the turbine will be submerged, as it will require nearly the total available head between the effluent channels and the lake to discharge this flow through the outlet pipe.

The outlet from the plant is a steel pipe 66 inches in diameter and extending 7,000 feet into the lake. This outlet and the method of laying it were described in our issue of August 15, 1912.

The small plant referred to at the beginning of this article as required for a portion of the city lying in another drainage area may eventually have to accommodate the sewage of 25,000 or 30,000 people, but is at present planned for 10,000 only. It will consist of a penstock from which the sewage, under a 50-food head, will pass through a water wheel, detritus tanks and screen chambers in parallel, one unit of two Imhoff tanks, a dosing device and a sprinkling filter consisting of three one-half acre units, settling basins and a 16-inch outlet pipe to deep water in the adjacent stream. Sludge beds and means for handling the sludge also will be provided.

SEWER MAINTENANCE IN CHICAGO.

At the end of the last fiscal year Chicago was maintaining 1,958 miles of sewers, connected with which were 83,061 catch basins, or 42 basins per mile of sewer. The Commissioner of Public Works, L. E. McGann, states that the appropriation for the year of $250,000 was wholly inadequate to permit of properly maintaining the sewers and cleaning the catch basins. This amount allowed $127.86 per mile of sewer, or only about $3 per catch basin if all the money had been spent on catch basin cleaning alone. As the cleaning of basins cost $4.03 per cleaning (this cost would probably be less were the cleaning more frequent), this sum would apparently permit not more than one cleaning of each basin a year and allow nothing for any other branch of sewer maintenance. As a matter of fact, only 26,820 basins were cleaned, or an average of less than one-third of a cleaning per basin per year.

Flushing was used in cleaning 3,510,000 lineal feet of sewers, at a cost of 81 cents per hundred lineal feet, and 340,000 lineal feet of sewers were cleaned by iron scrapers at a cost of $12.17 per hundred lineal feet. The cost of cleaning sewers with iron scrapers varied in the seven districts, the cost in each being approximately $35, $13, $10, $14, $9, $15 and $9, respectively.

The sum spent per mile of sewer in this work has never exceeded $143.87, which was the average in 1892, and has exceeded $127 only six times in the last twenty-five years. In spite of the infrequency of catch basin cleaning which has always been the practice in Chicago, and the resultant fact that money spent in building basins there appears to be worse than wasted, we still find the city building basins more rapidly than they are sewers, so that the number per mile of sewer has increased from 30 in 1893 to 40 at the end of 1911 and 42 at the end of 1912. This last amounts to one for about 125 feet of sewer, which in our opinion is several times more than is needed in any city, and especially in cities where they are not and never have been cleaned oftener than an average of once in three to six years. It is our belief that at least 60,000 of the catch basins in Chicago might better have been left unbuilt, and the money thus saved utilized for the more thorough cleaning of the remaining basins and of the sewers.

ORGANIZING PUBLIC HEALTH SERVICE.

Like most other municipal departments which have developed from small beginnings, the boards of public health in most of our cities are in need of reorganization, not only within themselves but in their relations to other departments of the city government generally. Several cities have employed experts in this line of business to make a survey of the public health situation and recommend improvements therein. One of the latest reports resulting from such a survey is that recently made to the Chamber of Commerce of Atlanta, Ga., by Franz Schneider, Jr., of the Russell Sage Foundation.

It does not appear from this report that conditions at Atlanta were found to be either very much better or very much worse than those in the majority of our reasonably well-governed cities. It is found, for instance, that a large part of the energy of and appropriation made to the Board of Health is used in street cleaning and garbage disposal, which have a comparatively small effect upon the health of the community —a condition that can be found in a great many cities. In analysing the records of death rates it was found that approximately 35 per cent of the total mortality is due to preventable diseases, although about 20 per cent of this 35 is due to pneumonia, meningitis and other diseases which are probably preventable only under ideal conditions.

The Board of Health directs the work of two separate organizations—the division of sanitary inspection and the health department proper. The former attends to the collection and disposal of refuse, street cleaning and sewer flushing—engineering aspects of matters which are essentially those of public cleanliness and decency. The health department proper hires and directs a health officer, maintains a laboratory, a detention hospital for contagious diseases and a tuberculosis sanitarium, looks after the registration of vital statistics, control of communicable diseases, milk and dairy inspection, meat and market inspection, mosquito reduction, plumbing inspection and medical relief of the poor. This department employs 22 persons, exclusive of the hospital staff, and receives for its maintenance $40,000 a year for the tuberculosis sanitarium and a similar sum for the other work of the department. This gives for the general department work less than 23 cents per inhabitant per year, a figure which is considerably below the minimum requirement for a modern, well-rounded and effective department. The quarantine work appears to be in competent hands, but the force of two inspectors is entirely inadequate. The isolation hospital is too small, and no facilities whatever are furnished for negro cases. It is also the opinion of Mr. Schneider that it is impossible to properly oversee the milk supply from 700 farms and 235 dealers and 41 dairies with two dairy inspectors and part of the time of one bacteriologist and an assistant. Similarly the services of two abattoir inspectors is insufficient to properly oversee the slaughtering of 70,000 animals a year in three slaughter houses. "Nearly a sixth of the department's already scanty appropriation is expended on plumbing inspection—a matter now con-

sidered to have very slight hygienic significance. The modern tendency is to place this work with the building department, as the function of the inspector is largely to see that the plumber does an honest job."

Concerning the organization of the Board of Health (which consists of one man appointed from each of ten wards), the report states that it would be difficult or impossible to obtain as many as ten men in any city of Atlanta's size, or even larger, who are competent to formulate and direct the policy of a modern health department, the work of which has been greatly specialized in recent years. "It is now considered wiser to hire a competent specialist in public health work, entrust him with responsibility for the department, and if a board be considered necessary to advise and check him, to have it as small and carefully chosen as possible."

It is recommended that the department take over certain work which is now being carried on by private benevolence, such as infant hygiene work and anti-tuberculosis work. All cases of a disease should be reported, and an up-to-date register of them maintained, the capacity of the sanitarium for blacks as well as for whites largely increased and premises disinfected after the removal or termination of a case. Free dispensary service and proper housing are among the other things recommended. It is also recommended that the present laboratory work, milk inspection and control of communicable diseases be materially extended and the present isolation hospital be greatly enlarged; that the city adopt a comprehensive housing law and establish a system of housing inspection; that the department create a division of publicity and education, and that the appropriation of the health department be increased to reasonable proportions in order to make these enlargements of its duties possible.

MUNICIPAL MARKETS

Adaptation to Modern Customs, Movements of Population and Transportation Facilities—Wholesale Terminal and Farmers' Markets.

The November issue of the annals of the American Academy of Political and Social Science is devoted, to the extent of 259 pages, to a discussion of the subject of "Reducing the Cost of Food Distribution." Here are given thirty-six articles written by different authors considering the several phases of the subject. These are divided under six heads, one of which is devoted to municipal markets and direct marketing. Some of these describe the markets of Baltimore, Cleveland, Indianapolis, Milwaukee, Philadelphia and Rochester, all of which have been described at greater or less length in Municipal Journal during the past few years. Introductory to these descriptions is a discussion of the subject by C. L. King of the Wharton School of Finance and Commerce of the University of Pennsylvania, from which we make the following extracts:

"Municipal markets do not develop themselves. The American attitude has been to set aside a building or a plot of land for a market and then expect the market to be a success. The making of a successful municipal market with maximum results necessitates virile energetic thought and supervision. In the first place, there must be a terminal wholesale market in cities of any size, where foodstuffs from both nearby and distant regions may be offered for sale as directly and as reliably as possible. A second essential is the adaptation of the kind and location of markets to modern customs, to movements in population and to transportation facilities. The third essential to a successful market policy is the encouragement of farmers' markets as distinct from merely groups of professional retailers, so that producer and consumer may be brought more directly together. Fourthly, charges for stall rents must be fixed at a point that will bring a reasonable return on an investment or present value, but not at a point that will return unduly large profits to the city. A fifth prerequisite to success is to give to stall renters every reasonable facility in buying, preserving and selling their produce. Again, the markets must be so regulated and supervised as to cleanliness, purity of food, and honesty in weights and measures, that it will be preferred by consumers as a buying place above other places not so regulated and supervised. And, finally, there must be thorough and systematic supervision and administration of the city's market policy, including reports on retail and wholesale prices, so that the public markets may be a real competitive factor, both in attracting trade and fixing consumers' prices.

"The great need of American cities is properly located, adequately equipped and well administered public terminal wholesale markets. The prime essential for such a market is location at a point where the tracks of all the railroads entering the city can terminate. . . . A requisite essential to success is sale at auction by bonded city officials, forbidden to be interested directly or indirectly in the trade of market wares of any kind. . . . The producer then has three choices; either alone or in co-operation with others, he can rent stands in one of the retail markets; he can ship directly to some wholesaler; or he can sell at these public auctions. The experience of European cities is that he adopts the third. Chilled rooms can be provided into which perishable products can be unloaded from the cars and repacked to suit the trade, without the deterioration inevitably resultant from unloading in a warm atmosphere. Under the market hall, cool, clean cellars and ample cold storage facilities can be made available for the temporary use of all buyers at reasonable rates. This will mean savings in transporting costs and warehouse facilities, and will prevent spoilage and lower values. A municipal canning and preserving plant conveniently located in the building pays for itself and prevents deterioration and waste."

Concerning the retail market, Mr. King says that this "must be adapted to modern conditions and usages. . . . Its size will depend upon the number of buyers round about and will be different for each city and in each section of the same city. . . . To compete with modern retailing methods, there must be co-operative deliveries, and to compete with the central buying concerns, there must be co-operative buying among the stall renters. . . . City ordinances should provide that none but bona fide farmers should display farmers' signs.

"To give farmers minimum rental costs, at slight expense to the city, in good residence locations, many cities in America and Europe have set aside streets for open air or curbstone markets. The rental for wagon space, as a rule, is nominal only. Thus in Atchison, Kan., and San Antonio, Texas, a charge of 10 cents a day is made for each wagon, while in Buffalo the rate for a one-horse vehicle is 25 cents and for a two-horse vehicle 50 cents per day. . . . Two and a half miles of streets in Cleveland are lined by 1,300 farmers and 400 hucksters. Both Baltimore and Montreal attract 1,500 wagons each day by their curbstone markets."

Mr. King quotes the Secretary of the Chamber of Commerce of Oklahoma City as follows: "There can be no question as to the curbstone market having reduced the cost of living to the average family in Oklahoma City. . . . The first day there were about 70 wagons pres-

ent on the market and a small crowd of buyers. Within a few weeks we counted 318 wagons on the street (their contents valued at $5,000) and a swarming crowd of people who jostled and shouldered each other in their efforts to secure the choicest first." Another writer later stated concerning the same market that actual figures showed decreases of from 25 to 50 per cent in the retail cost of all kinds of food supplies; in addition to which the market has so stimulated market gardening that twenty-five families have taken up small tracts adjoining the city for truck gardening since the market was established, and hundreds of inquiries have been received from others who contemplate doing so.

"Of greater importance than low rentals are adequate and proper facilities for stall renters and for the purchasing public. The public must have clear passageways and fair purchasing opportunities. All noises, singing, acrobatic performances and distribution of hand bills must be prohibited within the market limits and within a reasonable distance from the market. Hawkers and peddlers must be forbidden to ply their trades within at lease 500 feet of the market. . . . The one great social and advertising advantage of municipal markets, both for the stall renter and the buyer, is the opportunity afforded by the very nature of the market to enforce the laws and ordinances aimed at adulteration, misbranding and false weights and measures."

SEWAGE DISPOSAL PATENTS.

November 28, 1913.

Editor, Municipal Journal, New York City.

Dear Sir: I am in receipt of your letter of the 22d inst., asking that I write something for the readers of your paper concerning the subject of sewage disposal patents. Inasmuch as the question of sewage disposal patents promises, for some years to come, to be an interesting one, I am pleased to comply with your request. I take it that you are interested at the present time mainly in those patents relating to preliminary or tank treatment. The patents covering tanks are, principally, three in number:

1st. The Cameron septic tank patent which was both a process and apparatus patent.

2d. The Imhoff patent, which is an apparatus patent.

3d. The Travis patent, said to be a process.

Taking these up in the order named, the Cameron septic tank patent has been so widely discussed that the engineering profession is well informed concerning it. Inasmuch as this patent has expired I will mention it but briefly, as a matter of interest in its relation to the others.

The original English septic tank patent was an apparatus patent and covered a certain type of tank with its appliances. When the American patent was taken out it was broadened to cover the process as well as the apparatus. Much difficulty was experienced in securing the American patent. After several appeals, however, and two and one-half years delay, a patent was finally granted on March 15, 1897. By the laws then in force the life of this patent was limited to the life of the English patent and consequently expired with the English patent on November 8, 1909. A suit carried to the Supreme Court of the United States by the Cameron Company with the Treaty of Brussels as a basis having failed to resuscitate it, this patent would appear of no interest to anyone except such as operated tanks in accordance with the process of the patent, prior to the time of its expiration. From the decision of Judge LaCombe in the Saratoga case it would seem that to come within the process contemplated by the patent the effluent of the tank must necessarily be devoid of free oxygen. Whether or not the effluent of any given tank was devoid of free oxygen prior to November, 1909, would obviously be very difficult of proof, and the burden of the proof would, of course, lie with the owners of the patent. In addition to the tank effluent being devoid of oxygen, it would appear, on a reading of the patent, that the employment of the process would bring about certain results, the principal one of which is the liquefaction of the whole mass of solid organic matter contained in the sewage. This liquefaction of the whole mass of solid organic matter was said to be accomplished through the agency of anaerobic bacteria under the exclusion of air, light and agitation. It would seem, therefore, that for an infringer to enjoy the process covered by the patent he should be entitled to a complete liquefaction of all the solid matter contained in the flowing sewage in a tank or apparatus in which air, light and agitation are excluded.

In my experience I have never seen nor heard of a tank which was operated under such conditions and where such a result was attained.

It is highly probable that Mr. Cameron, who did much to advance the science of sanitary engineering was deceived, by the incomplete experiments which he conducted at Exeter, into believing that he had discovered a method for wholly liquefying the solids contained in sewage, just as Mouras had been similarily deceived twenty years before; an account of whose experiments can be found in the Engineering News of April 15, 1882. As far back as 1882 Mouras made experiments identical with Cameron and made the same claims as did Cameron.

Taking the Imhoff patents, it would appear that Dr. Imhoff has a patent which was granted to him under date of June 15, 1909, and covers an apparatus for the preliminary treatment of sewage. This apparatus consists of a two-story tank. The upper story of this tank is a settling tank and the lower story a digesting tank. In his apparatus Dr. Imhoff does not require or wish any sewage to pass from the upper story into the lower story and he recommends adequate means to prevent this. The purpose of his apparatus is to cause the decomposition to take place in a separate compartment where the solids contained in the sewage are segregated. The decomposition takes place in this lower story and wholly apart from the current of flowing sewage. This is the direct opposite of the Cameron patent; as all the testimony in the Saratoga case tended to prove that the decomposition took place upon the solid matters and within the flowing current of sewage.

The Travis patents for which application has been made are said to be process patents. In any event, whether they be process or apparatus patents the process is brought about in an apparatus that differs radically from the apparatus of Dr. Imhoff. In the Travis patent a definite proportion of the sewage is drawn from the upper story (it also being a two-story tank) with the suspended solids into the lower story. This is done for the purpose of facilitating the settling of the suspended solids by a slight downward current into the lower story. The drawing of this definite proportion of the inflowing sewage into the lower story, of course, requires a discharge pipe from the lower story to dispose of the effluent. This discharge pipe from the lower story is provided with a strainer or filter to prevent the solids deposited in the lower story from escaping.

There appears to be no conflict between the process employed in the Imhoff patents and the process employed in the Travis patent, and only a slight resemblance in the apparatus; this resemblance being in the fact that both are two-story tanks. It would appear that it is optional with the engineer in designing a plant to employ either the Imhoff or the Travis apparatus or process as his judgment may dictate. In either case the selection of one type should in no way involve the other or would either involve the Cameron patent. Yours very truly,

CLYDE POTTS.

CHARGES FOR SEWER SERVICE.

For a number of years the city of Springfield, Mass., has been following the practice of charging a flat fee for making connections with the sewerage system, this being $25 for an ordinary dwelling. Last year the Board of Public Works studied the subject of what is known there as "sewer entrance fees," and reported that they found Springfield's method to be most unusual, and also that the price charged was much less than the average of other cities. Information was obtained from thirty cities concerning the methods employed there, and it was found that nearly all of them assessed the cost of sewers in part according to frontage, but many of them according to area also. The average charge was found to be $54 per house lot. On the basis of this, the method of charging in Springfield was changed to $50 per house lot without regard to frontage, this applying to ordinary dwellings, while for other buildings the charge is $1 per front foot, with a minimum of $50, there being a further charge according to building area at a rate of 2½ cents per square foot of building area for the two lower stories and ½ cent a square foot for each additional story.

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Sewer House Connections.

In the majority of cities public construction of sewers ends with the mains, and the house connection is laid by the owner under the plumbing ordinances of the city. These ordinances are generally drawn up and enforced by a board of health which contains no engineers; and it would seem from the inspection of several such ordinances that they need to be revised by some one with engineering knowledge. As stated in a report on a health department elsewhere in this issue, the matter is one of engineering, anyhow, and not of health.

This is impressed upon us afresh by our having read recently three sets of such ordinances, each of which requires that "the house drain shall not be *less* than four inches in diameter and the fall shall not be less than one-quarter of an inch to the foot." No maximum limit is set to the size of the house connection nor any reference to the size of the main into which it discharges. The rules referred to were in force in cities varying from 25,000 to 600,000 population. We believe that the sewer department has a vital interest in this matter, and the house owner's pocketbook also is affected; and that by changing the word "less" to "more," with the addition of a clause permitting a larger size by special permission of the sewer department, both would be benefited and no one the worse off unless the plumber, whose profit might be less.

Up to the point where the sewage would back up into a laundry tub or other basement fixture, the smaller the house connection the cleaner it would be kept and the less the liability of stoppage from deposits of organic or other legitimate sewage matter. Other matters such as scrubbing brushes, chicken bones, etc., may stop up a small pipe, and should do so rather than enter the main sewer of a separate system. They have no right in a sewer, and the offender rather than the general public should be put to the expense of removing the resulting stoppage. About half the sewers of a modern separate system are 8-inch pipe, and no objects should be admitted to such size of sewer that will not pass through a 4-inch house connection.

The other question is as to capacity. Few, if any, bath and laundry tubs have discharge openings and pipes larger than 2 inches. A 4-inch pipe will carry as much as five such discharge pipes under a similar head. Laid at the grade specified it will carry, without backing up, the simultaneous discharge from a large bath tub and three laundry tubs emptying in two minutes, or the simultaneous discharge of three toilet tanks emptying in half a minute—a severe enough requirement for any residence. For hotels larger house connections should be permitted; a 6-inch pipe would carry three times as much as a 4-inch.

The cost of the smaller pipe is less; it keeps cleaner; it protects the main sewer from stoppage, and it is ample for the great majority of buildings. As a compromise a 6-inch pipe might be permitted; but to set a minimum and no maximum is to invite trouble for the sewer department from stoppages and extortion by plumbers.

Municipal Reports.

In an introduction to its latest report, the Sewerage and Water Board of New Orleans, La., states that, without publishing unessential details, it is its intention to make its annual reports as complete as possible and to exchange them with other cities and send them to those associated with and interested in similar municipal problems "with the view of adding whatever the New Orleans experience may add to the growing fund of common knowledge, from which by frank interchange of experience comes a gradual advancement of the associated arts."

This shows an admirable broad-minded spirit which it is unfortunate cannot be found among more city officials. In too many instances the officials feel, or else are afraid that the taxpayers will feel, that it is an unjustifiable waste of the people's money to print any information which is not for the exclusive benefit of the citizens themselves. This is a narrow view and one which is seldom found among engineers and other professional men; and it is due to the free communication of experiences and the information derived from them that we must attribute the great advance which has been made during the past fifty years in all the applied sciences and practical arts. It may be true that a city derives no immediate return from the money spent in publishing in its reports information which will be of assistance to other cities. But if each city acted in that spirit, municipal advancement would be greatly retarded, and moreover each instance of such generous contribution of knowledge is an incentive to other cities to be equally generous, and in this indirect way the city setting such an example will receive its share of the benefit due to the following of its example by other cities.

The WEEK'S NEWS

Paving in Hartford—Street Cave-in in Chicago—Commission to Prohibit River Pollution in Illinois—Portable Comfort Station—Waste Brings on Water Famine—Broken Main Effects Privations in Cincinnati—Efficient Work of City Commission—San Francisco Buys Railway—Adopt New Accounting System.

ROADS AND PAVEMENTS

Paving Work in Hartford.

Hartford, Conn.—By an expenditure of $100,000 secured through the co-operation of all parties concerned Hartford may now boast of a splendidly paved section of Farmington avenue between Asylum and Woodland streets. The trolley, electric and telephone companies together with the water department put in all necessary repairs before the street was paved. Tracks and conduits were laid, new wires put

Courtesy of Hartford Daily Times.
FARMINGTON AVENUE, HARTFORD, CONN.

in, while the city constructed catch basins and new sewer connections. The Edward Balf Company, on contract, has made a very satisfactory job of the paving work. The same contractor had the work before and the asphalt has stood the wear of fourteen years. The original job cost the City $2.59 per cubic yd. While the present job cost $1.39. The decrease in price was due to the fact that it was not necessary to renew the base.

Complete $2,000,000 Highways.

Stockton, Cal.—The formal dissolution of the San Joaquin County Highway Commission has marked the completion of nearly $2,000,000 worth of improved highway. G. A. Atherton, Frank West and for a time, B. A. Towne, now State Highway Commissioner composed the commission, which was organized here four years ago.

The improvement of the county roads was authorized by a bond election. Practically every highway leading out to Stockton has been improved for a distance of from ten to twenty-five miles with asphalt or oil macadam.

The good roads have not only attracted much attention and caused an influx of new residents but have also effected an increase in land values. The entire system has been turned over to the county. The cost of maintenance will be about 4 per cent of the original cost each year.

Donations Pay Road Improvements.

Chicago, Ill.—John Stewart, of Elburn, Ill., has subscribed $50,000 in cash to the Lincoln Highway Fund. Mr. Stewart, who is now in Europe, made the gift to the highway fund known through a letter in which he asked that a marker be placed at each end of the strip his money built as a memorial to him.

Pendleton, Ore.—In order to lighten the burden on some of the poorer property owners caused by paving West Webb street with hard-surface pavement, business men and auto owners are making subscriptions for their benefit. The street is one of the principal roads into the city and a pavement has been badly needed for years but had been held up owing to the number of small property owners who could not stand the expense. Mayor Matlock headed the list with a subscription of $100 and a long list of names was readily secured. The money will be applied on widows' payments especially.

The Year's Work in New Jersey.

Trenton, N. J.—The annual report of State Road Commissioner Colonel Edwin A. Stevens has been submitted to Acting Governor Leon R. Taylor.

According to the report, the mileage of roads built during the fiscal year of 1913, which closed October 31 last, was nearly 151 miles, which is more than forty per cent. more extensive than was built in the previous year and almost double that of the year before.

New Jersey has 1,835,023 miles of improved roads. The cost last year was $1,488,141.66 of which the State paid $521,-375.88.

The report shows that $1,470,035.99 was spent on repair of roads from county funds, and the receipts from automobile registration. In telling of the building up of a system to handle the work of the State road department through the addition of the State highway system and convict labor, Colonel Stevens says that many relocations of boundaries of roads had to be made; a trained force to handle the field and clerical work has been necessary; and the many problems arising will compel him to ask for an additional appropriation of $500,000 for the coming year.

Progress in Road Improvement.

Washington, D. C.—Expenditures in the United States for improvement of roads have more than doubled since 1904, according to figures compiled by the Office of Public Roads of the Department of Agriculture. In 1904 expenditures for this purpose amounted to $79,771,417, while in 1912 the total was $164,232,265, or an increase of $84,450,-948. It is shown that the greatest progress in road construction took place in those states that aided in the work by appropriations out of their state funds. In 1904 there were thirteen states that contributed $2,607,000, while in 1912 there were thirty-five states that appropriated to the extent of $43,757,438. The expenditures for this purpose in 1912 amounted to $74.65 per mile, which was double that of 1904, when the per mile outlay was $37.07. The states having the largest expenditures for state aid and trunk line roads in 1912 were: New York, $23,000,000; Pennsylvania, $4,000,000; Maryland, $3,370,000, and Connecticut, $3,000,000.

Money Allotted for Connecticut Roads.

Bridgeport, Conn.—The legislature of 1913 made an appropriation of $1,000,000 for the improvement of state aid roads for the two years ending Sept. 30, 1915. Under the law, $20,000 is the maximum amount that can be allotted to any one town during the two-year term. In conformity with that law, the Highway Department communicated with the various towns, informing them of the amount available and other details concerning the law. Town meetings were held, and of the 168 towns 149 asked for an allotment under the 1913 law with the following results:

136	towns	asked for	$20,000
1	town	asked for	12,000
6	towns	asked for	10,000
1	town	asked for	8,000
2	towns	asked for	4,000
1	town	asked for	5,000
1	town	asked for	3,000
1	town	asked for	2,500

The aggregate amount of requests of towns was $2,819,-014.42. In order to come within the $1,000,000 available,

it became necessary to scale the amount which would be allotted to each town. In doing this one-eighth of the towns were allotted $462,514.42; three-quarters of the towns were allotted $720,000; total, $1,182,514.42.

Cause of Chicago's Street Cave-in.

Chicago, Ill.—A bent mass of steel girders in the sub-basement of the Marshall Field & Co.'s new building in Chicago has been declared the cause of the depression in East Randolph street. The collapse of the sidewalk and

Courtesy of Chicago Daily News.
CAVE-IN IN EAST RANDOLPH STREET.

pavement for a distance of nearly one hundred feet and to a depth of two to ten feet wrought damage amounting to $100,000 and imperiled the lives of many pedestrians by threatening the destruction of the entire Field building. A water main burst; gas pipes and conduits for wires were torn out. The city officials were quick to act. Building Commissioner Henry Ericson and City Engineer John Ericson led a party through the building to determine the cause of the cave-in. They saw that several steel supports in the basement had dropped out of place, with the result that there had been an avalanche of debris from the street into the basement. In discussing the probable cause, Commissioner Ericson attributed it to the carelessness and speed in completing the building and said: "The material and construction of the building are all right, but the contractors placed too much confidence in the interlocked steel walls and became careless as to the weight that was permitted to rest upon them. Often in cases where the metal walls are used there is also a concrete wall erected as a sort of support for the steel walls, but this was not done here. A contributory cause to the cave-in of the street was the Masonic Temple. There is no steel foundation under the temple, and it is my opinion it has forced considerable pressure upon the steel walls, and that is what bent the girders, caused the sifting in of sand and dirt from the street and caused the cave-in."

Courtesy Chicago Daily News.
BENT SIDEWALK GIRDER—LOOKING FROM BELOW.

Experts Devise Highway Specifications.

Albany, N. Y.—Arthur H. Blanchard, director of the engineering courses at Columbia University, and Prevost Hubbard, of the Bureau of Industrial Research, Washington, who have been employed for the last month by the Department of Efficiency and Economy to attend the asphalt hearings before Highways Commissioner Carlisle, have prepared a set of their own specifications for all road work. Under these new specifications all roads will be 8 inches thick. All except one will consist of a 6-inch cement concrete foundation with a 2-inch top. The one exception will be the water-bound macadam road, which will have a 6-inch base of crushed stone. The four other specifications call for a bituminous macadam of simple construction, a bituminous macadam of graded stone, brick pavements and stone block pavement. The vexed question of asphalt purchases has been met by prescribing five tests for asphalt, qualification under any one of which will admit a material to use on the state roads. The experts say this plan is sufficiently general to admit every asphalt suitable for road construction, and strict enough in its analytical provisions to compel the delivery of only first grade material. Under it the products of no less than eleven manufacturers can be used, while there will be a considerable extension of this number when other manufacturers adapt their plants to the specifications. The penetration method will no longer be permitted on the roads by these recommendations. Instead of spreading asphalt or hot oil on the surface of the roads after they are built, all stone and binder must be thoroughly mixed before being laid. The brick and stone roads will have 6-inch concrete foundations, with a half-inch sand cushion and the blocks cemented with asphalt grout, instead of cement, it being claimed that the bituminous grout is more durable, less noisy and more easily repaired. Another novel feature of the specifications is a service test for all materials, requiring that they must have been in use for not less than two years before being admissible, and that manufacturers must have been in business for at least two years to demonstrate their ability to produce a high-grade material.

Wins Road Work Prize.

Salisbury, N. C.—Unity township, Rowan county, has been awarded the first prize of $500 in cash for doing the most work on the roads on "Good Roads Days." Cleveland township takes the second prize of $300, and Franklin the third of $200. The money has been ordered paid over by the county commissioners. The three townships now have $1,000 more to spend in road building.

SEWERAGE AND SANITATION

To Prevent Fox River Pollution.

Geneva, Ill.—Acting under authority conferred at the last session of the legislature, the State Rivers and Lakes Commission has ordered officials of the cities of Batavia, Aurora, Geneva, Elgin and St. Charles to take immediate steps to prevent the pollution of Fox river by sewage and factory wastes. The five cities were given until April 7, 1914, to prepare plans and specifications for filtration or sewage disposal plants or otherwise prepare to discontinue the emptying of sewage into the river. The Fox river cases are the first of the sort to be acted upon by the commission. Similar action will be taken in numerous other cities located along Illinois rivers or lakes if complaints are made and substantiated. Lake Forest and other North Shore cities that have complained of lake water pollution by factories are expected to take their grievances to the commission. Witnesses before the commission testified that during low water periods the Fox river was polluted to such an extent as to be a serious menace to the health of 200,000 inhabitants of the Fox river valley. It was also shown that thousands of tons of ice were taken from the river every year and sold in these cities and in Chicago. Another objection to the emptying of sewage into the river was the fact that fish were unable to survive.

Chicago Loses Title as "Healthiest City."

Chicago, Ill.—Chicago has lost its reputation as the healthiest of the great cities of the world because the City Council has refused to give the Health Department sufficient funds with which to carry on its work. This was the statement of health officials contained in the department's bulletin. Boston, New York and other cities with which Chicago is compared are shown to be spending more money for the preservation of the health of their citizens. These cities show a decreased death rate from diseases of a preventable nature, while Chicago's death rate from the same causes is increasing. Each year, according to the bulletin, Chicago suffers the loss of 17,000 citizens from diseases which might be prevented. In its annual budget the Health Department asks for 47 cents per capita, or $1.88 per family, to help eradicate preventable diseases.

Commissioners as Board of Health.

Altoona, Pa.—The establishment of a Department of Health will be one of the first duties demanding the attention of the new City Council, the new municipal law providing that this function be performed by a Board of Health. While the body is given the choice of appointing such board or exercising the duties itself, it is supposed that the latter course will be followed. In its capacity as a Board of Health, if this method is followed, the council will exercise under the new law "all rights, duties and obligations imposed by existing legislation upon boards of health in cities of the third class." The city clerk will be its secretary ex-officio.

Portable Comfort Stations.

Newark, N. J.—An experiment of using a portable steel comfort station for city recreation centers is being tried by the Board of Playground Commissioners. If the houses are found to be practicable, they probably will be used on the grounds which the commission has to rent. The station is 12 feet by 12, divided into four compartments. One compartment is for the use of boys, another for girls, a third for a shower bath and the fourth for a dressing-room. The cost of the house is about $500, with the plumbing arrangements, but without these it costs only $200.

Sewer System Completed.

Bend, Ore.—The local sewer system which has been under construction for the past eleven months has been completed. In all more than 4½ miles of main and lateral sewers have been put in, giving the town a system capable of caring for the needs of a city of 25,000 inhabitants. The total cost is $77,000.

Smallpox in Nashville.

Nashville, Tenn.—The monthly report of City Health Officer Hibbett shows that 33 cases of smallpox have been reported to the department during the month of November. This was the beginning of the present epidemic here, and many more cases will probably be shown in the next monthly report. Another disease that occurred many times in November is scarlet fever, with 28 cases.

Diphtheria in Detroit.

Washington, D. C.—Upon request of authorities of the city of Detroit the public health service has made a preliminary investigation of the diphtheria epidemic. According to the reports to the public service there have been 260 deaths from diphtheria in Detroit up to Dec. 1, and on Dec. 6 there were 225 cases under observation. An examination of 186 healthy persons showed that 64 per cent were bacillus carriers.

WATER SUPPLY

Dallas Filtration Plant in Operation.

Dallas, Tex.—The new filtration plant for the city of Dallas is now in full operation. Water from the reservoir has been turned into the settling basins, and the first actual test has been made. The new filtration plant, with its buildings, reservoirs and basins of various sizes and kinds, makes a splendid appearance fully in keeping with its cost, which is placed in excess of $230,000. The city of Dallas uses at present 14,000,000 gallons of water daily, and the filtration plant is designed for a present capacity of 15,000,000, with a possibility of increasing the output immediately to 18,000,000 gallons if the increase is found neceessary. The plant is composed of the two big reservoirs where the city's water supply is impounded, being brought a distance of about three miles through mains. The chemical laboratory building, where the scientific processes of treating the water to remove sediment and bacteria is carried on, is one of the most important parts of the plant. Another big feature is the pump station, where two engines with a combined capacity of 16,000,000 gallons daily are kept in constant operation.

Enormous Waste Causes Famine.

Beaver Falls, Pa.—Reckless extravagance and enormous waste are declared by members of council to be the real cause of frequent water famines in Beaver Falls. In the minds of council it is very clear that one of two things must be done—either meter the water, which means an outlay of approximately $10,000 for meters, or install a steam plant powerful enough to supply all the water the people want to use and waste. In either case, it is estimated the initial cost will be approximately the same, but the metered system would greatly reduce the cost of pumping. The water committee of council, composed of R. E. Tallon, W. J. Stewart and A. R. Raymer, was in Pittsburgh getting prices and estimates on boilers and steam engines such as will be necessary if a steam plant is installed. At present the water station is pumping about 200 gallons of water for each person, though 50 gallons per person are considered the normal consumption per day.

A Progressive Water Department.

Gloucester, Mass.—The work of the Water Department for the fiscal year which closed Nov. 30 shows a total of 13,257 feet of pipe extended or relaid during the year, an increase of 101 new takers having been made during the year, while 5 additional hydrants were placed in position. The receipts of the department for the year were $108,729, showing an increase of about $3,000 for the year, and the department shows a balance of $2,624.57 over the expenditures of the year. The department also has on hand a supply of coal amounting to 80 tons, all of which is paid for. The receipts of the department the past year were within $4,000 of paying the annual payments on the bonds, interest and cost of maintenance, while in 1904 these charges exceeded the receipts by about $35,000. During the year a tapping apparatus was purchased at a cost of $500 by means of which it is possible to make repairs and also replace sections of pipe without inconveniencing the water takers in the locality.

25,000 Without Water as Main Bursts.

Germantown, Pa.—About 25,000 persons living in the high portions of Germantown, Mount Airy and Chestnut Hill have been without water last week because of the inability of workmen to stop a leak in the main under Wissahickon creek.

Hospitals and homes suffered particularly. A force of 100 workmen, directed by Chief Davis, of the bureau of water, has been toiling under difficulties to complete the repair work,

To discover the leak a house to house canvass was made which proved futile. Finally it was found that the water was gushing through a big hole inthe main passing under Wissahickon creek. The chief estimated that the water loss was a million gallons per day.

Cincinnati Deprived of Water Supply.

Cincinnati, O.—A severe water famine, the result of a break in a 60-inch main, has threatened Cincinnati. Factories have been obliged to shut down and 60,000 workmen have been temporarily thrown out of employment. The danger in case of fire would have been great for Chief Bunker estimated that the water on hand could only have lasted an hour. Mayor Hunt has issued a proclamation entreating the people to use water sparingly. What water was available was given to the hospitals. Councilman

Mullen expressed the opinion that the accident would have been avoidable had the main been properly braced while improvements were in progress.

Well Pumps to Solve Water Supply.

Oakland, Cal.—The water supply of Oakland may be solved by the use of artesian well pumps provided other sources prove as prolific as the well recently completed. An average of 3,000,000 gallons a day has been delivered by that well. The pump cost $7,500. Oakland now consumes 19,000,000 gallons of water per day, so that seven or eight pumps like the one just installed will yield an abundant water supply.

Lower Water Rates.

Clifton, Ariz.—An opinion in the case of the Clifton Water and Improvement Company handed down by the corporation commission will put into effect on the first of the coming year, rates in the city of Clifton considerably below the former rates charged. The new rates divide the flat charges into a more diverse and complete number of divisions or classes, specifying the charges of each class. When water is sold by meter measurement the rates shall be as follows:

First 1,000 gallons or less	$1.00
1,001 to 3,000 gallons per M.	.70
3,001 to 15,000 gallons per M.	.50
15,001 to 30,000 gallons per M.	.40
30,001 to 75,000 gallons per M.	.30
75,001 to 100,000 gallons per M.	.25
Over 100,000 gallons per M.	.13½

To Sell Surplus Water for Power.

Albany, N. Y.—Surplus canal water is hereafter to be sold to the highest bidder for power purposes and a considerable income thus secured, has been announced by the state canal board. A raise from $200 to $7,500 a year already has been made for the use of the water at Lockport where the smaller price had prevailed for many years.

Install Public Drinking Fountains.

Spartanburg, S. C.—Three sanitary drinking fountains have been installed by the Department of Public Health at prominent places in the business section of the city, and others will be installed shortly.

STREET LIGHTING AND POWER

Insist on Lower Rates.

Springfield, Ill.—Unless the Utilities Company chooses to grant a gas rate of 90 cents a thousand cubic feet or less, the new holder recently completed will remain useless, according to a decision of the city commissioners. The council unanimously declared in favor of insisting on its former ultimatum to the gas company to reduce its present rate before permission will be granted for the laying of the proposed 20-inch main in West Jefferson street. Commissioners Spaulding and Coe were firm in their insistence that the company be given no privileges whatever until the price of gas is lowered and that the reduction must be made without any obligation or concession on the city's part that would bind the city to refrain from contesting for a still lower rate.

Install Lighting System.

St. Marys, Pa.—The new boulevard system of lighting has been completed, and the lights turned on. They now illuminate that portion of the business section which faces on the diamond. The posts are of the improved ornamental metal design, with a gracefully proportioned top supporting five large globes.

FIRE AND POLICE

Adopt Record System for Complaints.

Warwick, R. I.—The Board of Police Commissioners has authorized its clerk, James T. Lockwood, and Chief of Police Ellis A. Cranston to provide an adequate record system for receiving complaints to the department, both civil and criminal. This action by the board is an innovation so far as Warwick is concerned. Heretofore no pretence has been made of keeping an accurate and complete record of complaints that naturally come to the police department. Under the new regime all complaints of a criminal nature, as well as those relating to articles lost, lights out, defective highways and many others will be recorded in a book to be kept in the clerk's office expressly for that purpose.

Small Fire Loss.

Schenectady, N. Y.—Henry R. Yates, chief engineer of the Bureau of Fire, has filed with Commissioner of Public Safety John E. Cole his annual report. The striking features of the report are the showing that this city heads the state in low fire loss and the low average loss, which is $385 for each fire.

To Establish Fire Inspection in Erie, Pa.

Erie, Pa.—A regular weekly inspection of business houses and factories and mills of the city, something that has never been done in Erie, is advocated by Director Dundon of the safety department, who declares that such inspection made regularly, would not only prevent many fires but every fireman in the city's service would soon become familiar with the interiors of the stores and factories. While inspections have been made from time to time the system was never thorough because of lack of men and necessary time.

Mayor Prevents Discharge of Force.

Benton Harbor, Mich.—Mayor Miller, by using his veto has prevented "firing" the city's entire police force with the exception of the chief of police. The council had passed a resolution discharging all officers within 24 hours, but the mayor blocked the move, saying he could not provide suitable substitutes in such a short time. The council discharged the officers because they refused to turn over fees they had made on arrests.

Erect Police 'Phone System.

Portsmouth, Va.—The Gamewell Fire Alarm Telegraph Company, to which was awarded the contract for the installation of the police telephone system, is now engaged in constructing the lines. It is expected that the work will be completed within a short time, as excellent progress has already been made. The system will be comprised, at the outset, of 16 street boxes, each containing a telephone which will be accessible only to the members of the police department.

MOTOR VEHICLES

Combination Truck Installed.

Homestead, Pa.—The new hose, hook and ladder truck built for the Homestead Fire Department arrived at the Pennsylvania freight yards in time to fulfill the terms of the contract with the builders, the Seagrave Company, of Columbus, Ohio. The car will be brought to the central department in the Municipal Building and will be shortly placed in use. A chauffeur from the factory will operate the truck until a man is broken in for that purpose. The truck is a fine piece of mechanism and one of the best in this part of the state.

Auto Engines Save Money.

Nashville, Tenn.—According to figures given out by Chief Rozetta, of the Nashville Fire Department, it is saving $2,519.57 a year by using motor-driven fire engines. It is able to get to fires quicker and effects a saving to property owners in many instances in extinguishing a blaze while it is in its incipiency. Knoxville has five engine companies, and Chief Boyd urges that some of these engine companies should be equipped with motor trucks.

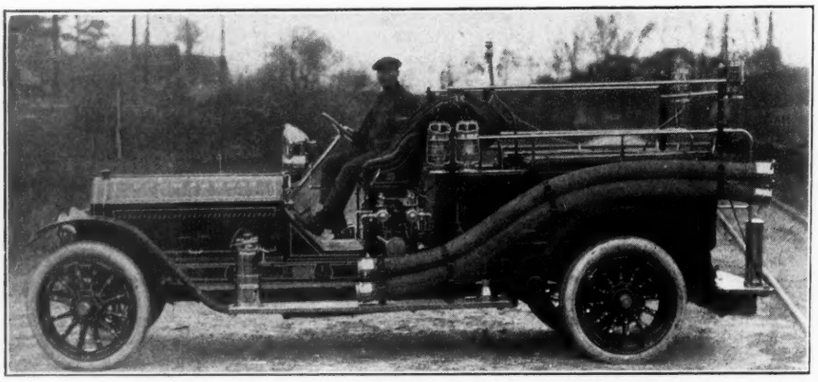
Tarrytown Receives Robertson Engine.

Tarrytown, N. Y.—A new Robertson six-cylinder 100-horse power fire engine for Tarrytown brought a group of firemen from that village to White Plains, as a demonstra-

tion was being made of the machine. The demonstration proved to be in every way successful.

American La France Engine Accepted.

Swampscott, Mass.—The new auto pumping engine has been accepted by the committee and will soon be put into commission. The engine is an American La France combination hose car and automobile pump. With a 103-horse power engine the machine is guaranteed to make a speed of at least 45 miles an hour. Of the latest type, the pump can make 700 gallons per minute. Assistant Chief G. F. Clay and Capt. E. C. Hodgkins expressed themselves as entirely satisfied with the machine.



Courtesy Daily Evening Item.
SWAMPSCOTT'S NEW ENGINE.

GOVERNMENT AND FINANCE

City Commission Works Well.

Fargo, N. D.—It was conceded on all sides that the Fargo city commissioners have made good. During the seven months since their election they have conscientiously done much to establish a business management of Fargo along economic lines. A business-like, systematized plan has been adopted in place of the old haphazard methods. The entire indebtedness of the city has been refunded and instead of bearing 6 and 7 per cent interest is now at 4 per cent and some of it at 3½ and on such a long term basis that it will not be a burden on the taxpayers. The meter system has been installed in the water works and the improvement districts for the entire city have been reduced from 24 to 3, greatly simplifying the work.

Gets Half Million of Bond Issue.

San Antonio, Tex.—Five hundred thousand dollars, or $506,249, to be exact, of the $3,450,000 bond issue money is now in the city treasury. The funds have been wired to the West Texas Bank & Trust Company, the city depository, by the Continental & Commercial Trust & Savings Bank. The $500,000 in bonds is divided as follows: Paving, $210,000; opening and widening of streets, $90,000; construction of bridges, $20,000; sanitary sewers, $40,000; storm sewers, $65,000; fire stations, $50,000, and sidewalks, $25,000. Mayor Brown is very gratified at the success of the bond issue and expects to realize the many improvements planned.

Commission Form Settled in Denver.

Denver, Colo.—Commission form of government in Denver has been definitely established by the refusal of the state supreme court to grant a new hearing to litigants who have recently attempted to oust the present city commissioners. In a decision handed down by the supreme court it was ruled that the commission form had been legally adopted by the voters and that the men now holding offices under it were the duly elected and qualified officials of Denver.

La Grande's City Commission in Office.

La Grande, Ore.—After transacting some routine matters, La Grande's old City Council stepped aside and the new commissioners recently elected under the commission-manager plan qualified and assumed office. Mac Wood, with one year to serve, was elected president of the commission.

STREET CLEANING AND REFUSE DISPOSAL

Garbage Disposal by Pigs Fails.

Grand Rapids, Mich.—The question of what the city is to do with its garbage has arisen again, this time with more than the usual suddenness, and with the same vital bearing on the public health. Stockholders of the Grand Rapids Garbage Holding Company, which is under agreement with the city to dispose of the garbage from the city, and which has been doing so on a pig farm between Newaygo and White Cloud, received notice of a sheriff's sale to be held at the farm. There are 2,000 pigs at the farm, and the company claimed in application to the Board of Health for a reduction of the rate which they pay for garbage, that 2,000 pigs are not enough to consume the output of the city. It is understood that the cost of purchase and freight to the farm, of $1.20 a ton, has proven too steep and that a reduction of 25 cents on the ton was requested. The sale will mark the end of another experiment to get rid of refuse by other means than a reducing or incinerating plant. Health Officer Slemons has announced that the city should adopt either one of these methods, after an interval for investigation.

Favors Incineration of Garbage.

Bridgeport, Conn.—Mayor Wilson, in discussing methods of garbage disposal, said that though he had received no complaints against the present method of disposing of the garbage, which is by burial at the Town Farm, yet to continue the burial of the garbage throughout the winter months might prove an awkward proposition, because of the frozen condition of the ground. It is known that Mayor Wilson is in favor of having the garbage disposed of by incineration, in a plant owned and operated by the city.

Clean Streets for Winter.

Des Moines, Ia.—Seventeen extra men, six teams and two dump carts have been sent out by Councilman Myerly to clean every paved street in the outlying districts of Des Moines for the winter. The dirt that has accumulated will be removed, in anticipation of freezing weather that would make it impossible to clean the streets. Reports from Councilman Myerly show that there is $8,000 more in the street sweeping fund this fall than there was a year ago, due to economy in the street sweeping department.

RAPID TRANSIT

San Francisco Buys Railway.

San Francisco, Cal.—The city of San Francisco acquired its second street railway when it took over the Union street line from the Presidio & Ferries Railroad Company. The voters sanctioned the purchase of this line in connection with a recent election at which a bond issue was endorsed for the building of several street railways to provide transportation to the Panama-Pacific Exposition. The board of supervisors has ordered the first payment of $50,000 on the Union street line.

Orders Bill for Subways.

Chicago, Ill.—An ordinance for subways for surface car lines to be drafted immediately has been ordered by a subcommittee of the local transportation committee. The measure will provide that the city pay for the subways out of its traction fund, and that the street car companies advance such additional funds as may be necessary, the

city to repay the companies as it may be able out of its share of the net receipts. Mayor Harrison gave his assent to that plan of financing, which was urged by Alderman Capitain. The features of the plan provide that the city shall own the subways and the companies shall pay a reasonable rental for their use; that they shall be operated as a part of the surface lines system for a single five-cent fare and transfers from subways to surface cars and that the ordinance shall not become effective until ratified by the voters in the April election. The cost of the subway system, including the short bores on the West Side, is estimated by the board of supervising engineers to cost $22,385,000.

Councils Pass Retaliatory Ordinances.

Montgomery, Ala.—Because the St. Louis & San Francisco Railroad, in spite of the mandate of the railroad commission, has discontinued to make stops at either Carbon Hill, Cordeva or Dora, their town councils have passed ordinances requiring the railroad to send its trains through the towns at no greater speed than six miles an hour. Instead of seeing the fast trains run through these towns at lightning speed they slowly creep alone until they have passed the corporate limits.

Declares Passes for Families Valid.

Harrisburg, Pa.—Governor Tener has taken the stand that if the custom of the railroads in issuing passes to families of employees has been legal in the past there is no reason why it should not be legal under the public service company act of 1913. It has been contended that the act prohibits issuance of passes to anyone except officials and employees, and the point has been raised that on some railroads there are agreements with men that under certain conditions and in return for meritorious service members of their families shall receive passes.

MISCELLANEOUS

Adopts New Accounting System.

Salt Lake City, Utah.—With the view of obtaining greater efficiency and simplicity in Salt Lake's accounting system, installed at a cost of $25,000, the present method will be abandoned after the first of the year. It will be supplanted by a more modern system devised by Herman H. Green, city auditor-elect. One of the greatest changes proposed by the system of Mr. Green is a complete revision in the classification of city funds. Under the new arrangement the funds will be classified according to the city departments instead of under various subheads, such as sewer and drain fund, streets and sidewalks fund, water works fund, etc., in use at the present time. Each department will have its own individual fund, making it possible for any one department to ascertain its financial conditions at a glance and eliminating the necessity of searching through several accounts to learn the amount of money at the disposal of a department. The monthly trial balance under the new system will set forth the following information: Revenue surplus, showing estimated income, appropriations authorized and balance available; departments—total appropriation, amount expended and balance available; income funds—estimated revenue from each source of income, amount received and balance due.

Merit System Adopted.

Portland, Ore.—All employees in every branch of the city's service have been on their good behavior since the much-dreaded efficiency schedule has been put into effect. Hereafter when an employee fails in any manner to give strict attention to duty or perform efficient service or is absent from duty without leave, demerits shall be given. And when an employee receives demerits so that his rating falls less than 70 per cent for one month his record can be considered sufficient grounds for dismissal. In a succession of months if his rating averages less than 79.5 per cent he may also be dismissed. Efficiency as defined in the code covers a multitude of things, including ability, effectiveness, personality and bravery. If an employee lacks any of those qualities he is given demerits. On the other hand there are merits given when an employee shows marked ability which may be used to offset whatever demerits he has received.

To Hire Village Manager.

Chicago, Ill.—Recently a Chicago paper printed in its "want" advertising columns the following:

VILLAGE MANAGER—AT GLENCOE, ILL.; an experienced man between 30 and 40 years of age, capable of systematizing details, managing employes, and meeting the public; salary $1,800 per year. All applications must be made in writing accompanied by letters from at least three references. Do not telephone or call. Address F X 68, Tribune.

The village of Glencoe has noted the successful operation of the manager plan at River Forest and decided to profit by its experience. Chairman Gill, of the village board's committee stated that to run affairs more smoothly some person who could devote his entire time to departmental matters was required. The manager will be placed under the control of the village board.

Plans Municipal Cooking.

Kansas City, Kan.—Municipal cooking is to be tried in Kansas City. As the city owns an electric power plant, it is endeavoring to compete with natural gas companies and despotic coal dealers. To this end L. H. Chapman, commissioner of water and light, is going to distribute electric cookers among the patrons of the light plant, which are to be used for a time at the city's expense. The purpose of the plan is to demonstrate to the people that cooking by electricity in Kansas City is cheaper than any other method.

Equip Municipal Repair Shop.

Duluth, Minn.—Shortly after the first of the year this city will have a fully equipped central repair shop at which the repairs of all city departments can be handled. The utility division has purchased an up-to-date lathe, costing $1,320. This will probably be followed by a shaper, which, with the lathe, will enable the shop to handle almost any kind of iron or steel work. A hand saw and planer will also be purchased. Considerable repair work has already been done for several departments at the municipal repair shop.

Plan Municipal Lodging House.

Boston, Mass.—The cheap lodging houses like the Arcadia, which was demolished by fire with a loss of twenty-eight lives, must be abolished in Boston. This is the ultimatum of Mayor Fitzgerald. He declared that he was going to do everything in his power to eliminate them and establish in their place a great municipal lodging house where derelicts may obtain a bed at the same price with the assurance of safety to life and health. It is his intention to go before the City Council at its next meeting and ask an appropriation of $5,000 for the purpose of drafting plans for such an institution.

High Waters Cause Serious Floods.

Smithville, Tex.—The Colorado river had reached 46 feet at this town. Many houses and dead stock were swept down the river, while a large number of families were marooned. The ice, water and electric light plants had shut down for the water in the boiler rooms had risen many feet. In Cameron, Little river flooded the district so badly that railroad traffic was cut off. Small bridges throughout the county have been washed away. The water company's plant was under water, while the lighting plant was obliged to run on short time. The Brazos river in Falls county was slowly falling after flooding sections of the towns of Marlin and Waco.

Sell Christmas Stock.

Cleveland, O.—Twenty thousand shares of stock in "Cleveland, the City of Good Will, Unlimited," have been put on sale here. The proceeds will be used to defray the expenses of Cleveland's first community Christmas. Cleveland's community Christmas will include celebrations in the parks, schools and churches, a giant Christmas tree in the public square and basket donations of Christmas dinners to the poor. Three tons of chickens will be distributed.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Defect in Flume—Notice.

Bjork v. City of Tacoma.—Evidence that a hole in a flume maintained by a city on an unfenced right of way had been open continuously for two or three weeks before a child fell therein and was drowned warranted the jury in imputing notice thereof to the city.—Supreme Court of Washington, 135 P. R., 1005.

Officers—Powers.

Burns v. City of New York.—Persons dealing with public officers respecting public property are chargeable with knowledge of the limitation of power imposed upon such officers and can gain no advantage against a municipal or other public corporation by reliance upon acts of such officers in excess of their powers.—New York Supreme Court, 143 N. Y. S., 952.

Paving—Defective Advertisement—Assessment.

Koontz v. City of Centerville.—Where paving bids were properly advertised for, and the council, on opening the bids, declared them all unsatisfactory, and again advertised for bids, but only in three publications instead of four, and less than ten days elapsed between such publications and the opening of the bids, if such publication was defective, it did not affect the jurisdiction of the council to make the assessment.—Supreme Court of Iowa, 143 N. W. R., 490.

Awarding Bonds.

City of Portland et al v. Albee, Mayor, et al.—Under Portland Charter 1913, providing that whenever bonds of the city of Portland are offered for sale, and there is a balance to the credit of any sinking fund or special fund not invested, said bonds may be awarded at par and accrued interest to the city treasurer as an investment for such bonds, the common council may in its discretion award the bonds to a private purchaser whose bid is the same, the word "may" not being equivalent to "must," but conferring upon the council the discretionary power of awarding the bonds; the two bids being the same.—Supreme Court of Oregon, 135 P. R., 897.

Assessment—Action to Cancel—Tender.

Miller v. City of Lincoln.—Plaintiff, being the owner of land known as irregular tract 29, which was crossed by a boulevard of the city, sold and conveyed to the city that part thereof lying on one side of the boulevard. The part sold to the city was thereupon designated as lot 78, and plaintiff's tract as lot 77. Taxes were afterwards assessed against both tracts jointly described in the assessment as lot 29. The evidence is not definite and exact as to the acreage of either tract, nor as to the relative value thereof. Held that, as it is impossible to ascertain the equitable proportion of the tax chargeable against plaintiff's tract, the assessment is void, and the plaintiff was not required to tender any portion of the tax before bringing his action to cancel the same.—Supreme Court of Nebraska, 143 N. W. R., 921.

Contracts—Performance—Acceptance.

Burton et al. v. City of Rutland.—Under Rutland Charter, providing that the commissioner of public works shall have no power to expend money or incur any debt beyond the amount of the appropriations made by the board of aldermen, and section, providing that the commissioner shall have the exclusive, general management and control of the work on city streets, bridges, etc., and shall see that they are properly constructed and repaired, and shall have the same powers in respect to repairs as road commissioners and selectmen in towns, but that he shall have no power to spend any money or incur any debt beyond the amount of appropriations made by the city council, the commissioner who made a contract for the construction of a bridge, which undertook to authorize him to accept the work, could bind the city by his acceptance thereof, and the board of finance could not reject the work, and did not reject it by refusing to pay therefor.—Supreme Court of Vermont.

Assessments—Review—Statutory Provision.

City of Indianapolis et al. v. Hawkins et al.—Under Burns' Ann. St. 1908, authorizing the owners of land assessed for the construction of a sewer to file a petition to the circuit or superior court, showing that the assessment is excessive, and requiring the court to appoint appraisers to assess the benefits to such land, whose report shall be final and conclusive, the judge of the court acts in an executive or administrative capacity, and no appeal lies to review his acts. —Supreme Court of Indiana, 103 N. E. R., 10.

Bridge Contract.—Suspension of Work.—Allowance for Costs.

Ryan v. City of New York.—A clause, in a city's contract with plaintiff for the construction of a bridge anchorage, authorizing the city to suspend the whole or any part of the work without compensation to plaintiff, should be construed as covering only an actual cessation of work under direction of the city, and did not, while the work was actually progressing, serve as absolution for any and all delays that plaintiff might suffer incident to material changes of plan or failure to have completed, within the prescribed time, work to be done by others, on completion of which the progress of plaintiff's work necessarily depended; the city being under an implied obligation to proceed with good faith and diligence as to all such matters and carry them on without unnecessary delay. Where an action by a contractor for the construction of a bridge anchorage, against a city for breach of contract and for damages for delay, was long and involved intricate and difficult questions, and an extra allowance would afford plaintiff meager indemnity for the expense of the trial, it was properly granted.—New York Supreme Court, 143 N. Y. S., 974.

Taxation—Assessments—Statute.

Hawkeye Lumber Co. v. Board of Review of City of Oskaloosa et al.—Code declares that the Board of Review shall meet on the first Monday of April and sit from day to day until all its duties are completed, which shall be not later than the first of May. Code Supp. 1907 requires appeals to be taken from its action within twenty days after adjournment. Held, that while the statute provides that the board's duties shall be performed not later than the first of May it must be considered as directory, notwithstanding the fact that a prompt compliance is necessary to enable the county auditor to make out and transmit to the State Auditor an abstract of the property in his county, and the Board of Equalization must consider the assessments made by the Board of Review, and hence, where the Board of Review did not adjourn until May 23, an appeal taken by notice not served until May 29 was within time; it appearing that the final action of the board on the assessment from which the appeal was taken was not had until adjournment.—Supreme Court of Iowa, 143 N. W. R., 563.

Shade Trees—Rights of Abutting Owners.

Moore v. Carolina Power & Light Co.—Plaintiffs were abutting owners of property on a city street. An electric light company, for the purpose of facilitating the use and operation of its lines and poles, sought to so trim as to materially damage certain shade trees, bordering on the street in front of plaintiffs' property. Suit was brought for damages alleging depreciation of plaintiffs' property because of the impairment of its use and enjoyment resulting from the above depredation. The defense was interposed that as the fee in the streets belonged to the state, and as defendant company was a quasi public corporation, plaintiffs had no rights against the company that could interfere with any impairment of the trees for its convenience. The Supreme Court of North Carolina, however, while holding that a municipal corporation which enjoys the possession of its streets has absolute control over bordering trees providing that no oppression is exercised impairing the rights of abutting owners in their easements in the shade of the trees, yet decided that this municipal power of control was not delegable, and could not be conferred upon even a quasi public corporation, with the result that defendant company was required to stand for any damages resulting. —Supreme Court of North Carolina, 79 S. E. R., 596.

NEWS OF THE SOCIETIES

Calendar of Meetings.

December 20-31.
THE ARKANSAS ASSOCIATION OF SURVEYORS AND CIVIL ENGINEERS.—Fifth annual meeting, Hotel Marion, Little Rock. J. O. Jones, Secretary, Birtha, Ark.

January 10.
MUNICIPAL ENGINEERS OF THE CITY OF NEW YORK.—Eleventh Annual Dinner, Hotel Savoy. George A. Taber, Secretary, 29 West 39th St.

January 16.
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—Annual meeting, New York City. J. R. Wemlinger, Secretary, 11 Broadway, New York City.

January 29-31.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—Mid Year Meeting and Banquet, New York, N. Y. E. B. Burritt, Secretary-Treasurer, Engineering Societies' Building, 29 West 39th Street, New York, N. Y.

February 12-14.
NATIONAL CONFERENCE ON CONCRETE ROAD BUILDING.—Auditorium Hotel, Chicago, Ill., J. P. Beck, Secretary, 72 West Adams St., Chicago, Ill.

February 16-20.
NATIONAL ASSOCIATION OF CEMENT USERS.—Fourth Annual Convention, Chicago, Ill. Edward E. Krauss, Secretary, Harrison Building, Philadelphia, Pa.

American Road Builders' Association.

The tenth annual convention was held at the First Regiment Armory, Philadelphia, December 9-12. The attendance was large, over 2,500, in spite of the fact that the registration feature practically excluded all persons not really interested in road building. The attendance at the reading of the technical papers and discussions was good, perhaps 300 to 400 members being present. In the exhibition hall were the products of about a hundred manufacturers.

The program of reading of papers was carried out substantially as published in the Municipal Journal, November 27th. The social events of the meeting included a banquet and an enjoyable as well as useful feature was an automobile trip over an experimental road laid in the outskirts of the city.

The most tangible results of the meeting were the passing of two resolutions, one petitioning Congress to authorize President Wilson to appoint a commission from civil life to make an investigation of the question of Federal appropriations for road construction and to appropriate sufficient money to make the investigation a searching one.

It was further resolved that there should be an amalgamation of all national road associations and that only one general convention should be held in place of the several conventions that have been held in the past.

About one hundred manufacturers and dealers took part in the exhibition in the main hall of the armory. Their names, the article shown and the names of the personal representatives follow.

Acme Road Machinery Co., Frankfort, N. Y.—Photographs. Representatives: W. A. Cook, president; P B. Cook, secretary; W. M. Hoag, manager New York office.

American Rolling Mill Co., Middletown, O.—American Ingot iron culverts. Representatives: H. C. See, B. G. Marshall, B. S. De Frees.

Amies Road Company, Easton, Pa.—Samples of Amiesite road material and photographs of construction. Representatives: W. T. Newcomb, H. B. Allen, A. G. Barris, H. H. Mitchell, M. T. Coakley, chemical engineer; R. B. Cook, assistant to president.

Art Stone Co., Waynesboro, Pa.—Samples of decorative concrete for bridge work. Representative: Amos Strouper.

The Autocar Company, Ardmore, Pa.—Automobile truck for use of highway maintenance gang. Body is divided into compartments for stone, sand, cement, etc., and for tools. Representatives: J. S. Clark, vice-president; J. N. Perry, Ardmore; D. C. Eaton; P. Prouty, Philadelphia; J. A. Hess, H. S. Lane, Morris Maeu, Howard Booz, N. S. Pringle, Ardmore; C. H. Spencer, advertising manager; H. M. Coale, sales manager.

The Bain Wagon Co., Kenosha, Wis.—Bottom dumping wagon, 1½ cubic yard capacity. Representatives: N. W. Strong, C. A. Conan, Philadelphia.

R. D. Baker & Co., Home Bank Building, Detroit, Mich.—Full-sized armored joint for concrete pavements, including elastic filler and the installing device. Representatives: R. D. Baker, Detroit; G. H. Bussey, sales manager, Detroit.

Barber Asphalt Paving Co., Land Title Building, Philadelphia, Pa.—Samples of Bermudez and Trinidad asphalts; placard stating that 2,000 miles of roadway 15 feet wide had been treated with Bermudez road oil; photographs. Representatives: C. W. Bayliss, manager, Philadelphia; E. W. McCrea, New York; J. J. Staley, Philadelphia; Harry Kearney, T. H. Morris, Chicago; S. Miller, Jr., R. R. Van Tine, Philadelphia.

Barrett Manufacturing Co., New York.—Samples of Tarvia; photographs of construction and finished roads. Representatives: C. M. Kennedy, J. C. Leonard, L. J. Burleigh, R. E. Eggleston, Baltimore; Thomas McCrady, Pittsburgh; Lester Wittenberg, Philadelphia; C. M. Cottam, St. Louis; H. B. Edmundson, New York; F. B. Earl, New York; A. E. Chavalier, Philadelphia; S. F. Hutchinson, P. P. Sharples, S. M. Conan, New York.

Blanchard & Hubbard, Consulting Engineers, Broadway, New York City.—Books and pamphlets. Representatives: Prof. A H. Blanchard, New York; Prevost Hubbard, Washington.

Bausch & Lomb Co., Rochester, N. Y.—Engineering and surveying instruments. Representatives: W. L. Johnson, A. E. Welti.

Bucyrus Co., S. Milwaukee, Wis.—Photograph of steam shovels engaged in construction work. A 23-ton shovel was demonstrated in a lot near the armory. Representatives: E. G. Lewis, P. E. Dutcher.

Buff & Buff, Jamaica Plains, New York.—Model 21, for highway work; dumpy levels for highway work; precise levels, kind used in New York subways. Representatives: W. J. Buff, manager, Boston.

Buffalo-Pitts Co., Buffalo, N. Y.—Photographs of steam rollers, traction engines and cars; stone spreading car. Representatives: F. G. Batchellor, sales manager, Buffalo; G. W. Briggs, J. M. Dennis, New York.

E. E. Buhler & Co., 103 Park Ave., New York.—Ebco curb bar. Representative: H. F. Clark.

The Philip Carey Company, Cincinnati, O.—Elastite joints for taking up expansion of any kind of paving. A new style, Elastite No. 2,, has two layers of asphalt wool felt and a layer of asphalt filler. Representatives: F. C. Bowman, Cincinnati; A. C. W. Watus, Philadelphia; F. H. Shipe, Scranton; P. J. Daly, Richmond, Va.; L. S. Eastwick, F. L. Smith, Philadelphia.

J. I. Case T. M. Co., Racine, Wis.—Gasoline traction engine, 20-40 h. p., operating 8x15 jaw crusher, capacity 15 tons per hour. Representatives: R. B. Coleman, sales manager, Racine; G. A. Dechant, Harrisburg; Victor Faford, A. B. Orr, Racine; C. S. Wilson, Racine; John Zacharies, Allentown.

Champion Wagon Co., Owego, N. Y.—Bottom dumping wagon, 1½ yards capacity. Representatives: A. L. Cole, J. H. Hipple.

Clip-Bar Mfg. Co., 2546 Oliver St., Philadelphia.—Protection for the edge of concrete curbing. Representatives: A. Elmer Davis, manager and secretary; J. N. Inman, Philadelphia; F. J. Geiger.

Columbia Wagon Co., Columbia, Pa.—Bottom dumping wagon. Representatives: W. T. Garrison, president, Columbia, Pa.; M. B. Wunder.

Concrete Form & Engine Co., Detroit, Mich.—Model of large culvert form; full-sized culvert. Copies of letters from F. W. Buffum, State Highway Commissioner of Missouri, showing order for forms of 2, 3 and 4 foot sizes, dated as follows: Sep 28, Oct. 9; Oct. 10; Oct. 25, Oct. 25. Representatives: W. B. Gregory, president; W. Douglas Waugh, Detroit; J. M. Knafle, eastern representative.

The Dolarway Paving Co., 17 Battery Pl., New York City.—Sample of pavement cut from street. Photographs showing methods of construction and finished work. Representatives: Wm. Pindle, president; A. E. Ashbrook, assistant to president.

The Dunn Wire-Cut-Lug Brick Co., Conneaut, O.—Sections of brick pavements as laid on city streets and county highways. Representatives: F. B. Dunn, general manager; W. C. Perkins, chief engineer, Niagara Falls, N. Y. F. T. Townsend, engineer, Buffalo.

The Dustoline for Roads Co., Summit, N. J.—Samples of Dustoline sections of roads; photographs of streets on which Dustoline is used: Representatives: Fred L. La Rowe, C. M. Kerins.

Eagle Wagon Works, Auburn, N. Y.—Bottom dumping wagon, 1½ cu. yd. capacity, with arched rear axle. Model

of two-wheel traction cars. Representatives: C. C. Avery, general sales manager; F. C. Bradt, Philadelphia; I. H. Kurper, J. C. Avery, Auburn.

A. B. Farquhar, York, Pa.—Photographs of traction engines. Representatives: E. B. Van Atta, New York; T. S. Klinefelter, York, Pa.

The Frick Co., Waynesboro, Pa.—Traction engine. Representatives: W. F. Hovetter; W. R. Sniverly, M. G. Dessouer, Philadelphia.

Galion Iron Works & Mfg. Co., Galion, O.—Models: Eclipse unloading machine; stone spreader; five graders, varying in weight from 900 to 4,000 pounds; eight styles road drags, varying from 250 to 350 pounds; scarifier. Representatives: D. C. Boyd, president; F. L. Hursh, C. R. Lacy, O. P. Beck, sales manager, Galion; E. C. Gledhill, Tom Derickson, C. B. Pepper, Columbia, S. C.

Good Roads Machinery Co., Kennett Square, Pa.—Models of Champion crusher; Champion grader; improved steel Champion grader; Monarch steam roller. Representatives: F. M. Blethen, Hazelton; George E. Pierson, Boston; G. K. Smith, Albany; F. A. Wunder, Philadelphia; G. S. Carr, New York.

W. & L. E. Gurley, Troy, N. Y.—Light transit for highway work; an explorer's level weighing only 2½ pounds. Representatives: H. M. Dibert; S. M. Pike.

The William Hartranft Cement Co., Inc.—Samples of Old Dominoin, Penn Allen and Phoenix cement. Illustrated colored pictures of cement structures. Representatives: Charles A. Cox, Thomas O. Brotherton, John Larimer, Joseph McCabe, H. M. Fetter, vice-president: A. N. Nash, treasurer.

Hassam Paving Co., Worcester, Mass.—Photographs and samples. Representatives: B. C. Collier, New York; Harold Parker, vice-president, Lancaster, Mass.

Headley Good Roads Co., Real Estate Trust Building, Philadelphia, Pa.—Sample of "Bicomac," a concrete in which the binding material is an emulsion of water and 100 penetration asphalt and hydraulic cement. Bituminous road planer. Representatives: M. T. Headley, president; T. B. Headley, engineer; J. P. Hennessey.

Huber Mfg. Co., Marion, O.—Traction engine with scarifier; gasoline engine operating crusher. Photographs of construction work employing Huber rollers and engines. Representatives: J. A. Rose, F. P. Moore, F. O. Taylor, Harrisburg; Harry Grieb, J. S. Kilbury, secretary; J. M. Nuby, Marion.

R. W. Hunt Co., Consulting Engineers, Chicago, Ill.—Literature. Representatives: H. H. Morgan, A. L. Davis.

Charles Hvass & Co., 509 E. 19th St., New York City.—Scarifier, large and small tar kettle, oil spreading wagon, motor street cleaner. Representatives: C. T. Hvass, B. C. Hvass.

Ingersoll-Rand Co., 11 Broadway, New York.—Two tripod drills; jackhammer drill. Representatives: Philip Weiss, Philadelphia; C. C. Perkins.

Ingraham - Richardson Enamelled Sign Co., Beaver Falls, Pa.—Samples of signs. Representatives: John Mulholland, K. K. Foster, R. C. Mason, Beaver Falls, Pa.

Iroquois Iron Works of Barber Asphalt Co., Buffalo, N. Y.—Five-ton Iroquois asphalt roller. Photographs and descriptive matter of many appliances and tools used in every branch of bituminous pavement construction. Representative: T. H. Morris, Chicago.

The Jennison-Wright Co., Toledo, O.—Creosoted wood lug paving blocks; a new product. Full-sized sections of pavement; also special floor pavement; hexagonal block pavement. Representatives: H. G. Jennison, L. R. Drinker, R. W. Johnson.

Kent Machine Co., Columbus, O.—Concrete mixer. Representative: F. A. Kirshaw.

Kentucky Wagon Mfg. Co., Louisville, Ky.—Bottom dumping wagon, 1½ cubic yard. Representative: J. L. Lindsey.

Keuffel & Esser Co., Hoboken, N. J.—Surveyors' and draughtsmen's instruments. Representative: E. W. Kraft.

The Knickerbocker Co., Jackson, Mich.—The Coltrin continuous concrete mixer. Representative: A. H. Dunn Co., Philadelphia.

Koehring Machine Co., Milwaukee, Wis.—The street paving mixer shipped to the show did not arrive in time to be demonstrated: Representatives: M. Koehring, W. M. Bucher, New York; R. E. Brooks, New York; L. T. Ward, Milwaukee; Oscar Twitchell, Philadelphia; F. O. Johnson, G. E. Hillsman, H. B. Trevor, Rochester; N. Brown, C. T. Topping. W. W. Williams, Columbus, O.

The Lansing Co., Lansing, Mich.—Broncho concrete mixer. Representatives: Robert Flanigan; H. R. Tipple, J. H. Hoffman.

Lehigh Portland Cement Co., Allentown, Pa. Representatives: W. A. Fuchs, advertising manager; F. M. Schilling, manager promotion department; Gaston Daus, Philadelphia, district sales manager; E. S. Larned, New England, district sales manager; C. S. King, A. E. Daley, P. L. Hayden, H. L. Brady, Howard Rhode, E. C. Shimer, J. Ralph Nagle. About 50 delegates were guests of the company on a trip to Allentown on a special trolley car. An inspection of the mills was made. Luncheon was served on the car and supper at the Allentown Club.

Link Belt Co., Nicetown, Pa., and Chicago, Ill.—Photographs showing automatic loading device used in a variety of work. Representative: H. D. Pratt.

Locomobile Company of America.—Five-ton Locomobile truck with Budd end dumping body. Representatives: G. H. Duck, sales manager, New York; A. L. Riker, chief engineer: Clinton Brettell, Bridgeport, Conn; J. T. Roche, general sales manager; A. W. Robinson, sales manager truck department.

McAvoy Vitrified Brick Co., 1345 Arch St., Philadelphia, Pa.—Samples of brick; photographs. Representatives: John C. McAvoy, T. B. McAvoy, Jr.; E. L. Dooley, Philadelphia.

Merchant & Evans Co., Arch St., Philadelphia, Pa.—Tractor truck, 5 tons capacity. Representatives: M. P. Stoney; R. F. Flamaud, superintendent.

Alexander Milburn Co., Baltimore, Md.—Acetylene lamps. Representatives: C. R. Pollard, J. A. Schleicher.

Marion Steam Shovel Co., Marion, O.—Photographs showing Marion shovels engaged in construction work. Model of shovel. Representatives: E. R. Wilson, T. J. Brady, New York; W. R. Wadell.

National Paving Brick Manufacturers' Association, Cleveland, O.—Samples of brick made by the associated members; two styles of hillside block. Representatives: Charles J. Deckman, president; H. H. Macdonald, assistant secretary.

Oliver Chilled Plow Co., South Bend, Ind.—Contractors' plows. Representatives: C. P. Cover, H. R. Beckwith, E. C. Lynch.

Packard Motor Car Co., Detroit, Mich.—Six-ton end dumping auto truck with hydraulic hoist, locomotive type brake, speed about 10 miles per hour, controlled by automatic governor, multiple disk clutch. Representatives: W. F. Roth, C. O. Raynsford, Philadelphia; C. R. Norton, manager truck sales department, Detroit.

W. H. Pickett Co., Inc., 214 Harmon Building, Philadelphia, Pa.,—Contractors' construction car, all steel, side dumping and track made by Youngstown Car & Manufacturing Co. Representative: C. G. A. Schmidt, Jr.

Rapid Mixer Co., Grand Rapids, Mich.—Hot mixer for bituminous pavements. Representatives: E. W. Seamans, president; W. E. Crowell, general sales manager; E. A. Arthur, Philadelphia.

Robeson Process Co., Pennington, N. Y.—Samples glutrin; slag pavement bound with glutrin; photographs showing roads in front of White House, Washington; Princeton College; Broad St., Columbus, O.; Connecticut State highway, etc., where Glutrin has beeen used. In a testing laboratory experiments were made showing the strength of glutrin bond compared with cement; briquettes composed of 1 glutrin, 50 sand, 24 house old broke at about 40 pounds; cylinder of powdered rock tested on Page machine showed that were bound with glutrin the sample required four to six times as many blows to break it as where water bound: Representatives: J. S. Robeson, C. A. Rapallo, secretary; L. H. Woddrap, treasurer; G. N. Moore, F. T. Hart, H. H. Hunt, chief chemist: G. I. Lindsey, New York: W. M. Whittan, Columbus, O. Mr. Schinker; F. P. Cooms, Pennington, N. Y.; J. L. Osmond.

Rocmac Road Corporation of America, Lafayette Building, Philadelphia, Pa.—Samples and photographs of Rocmac. Representatives: Walter Haines, J. E. Teall.

J. J. Shannon, 1744 Market St., Philadelphia.—A Chicago paver made by Chicago Concrete Machinery Co., Milwaukee, Wis. This was the largest street paving mixer in the show. Was operated by a Westinghousee induction motor of a new type, valuable for contractors because its frame is pressed steel and consequent light weight. No.

104 Smith Mascot, 4 cubic foot mixer, having gears completely enclosed, made by T. L. Smith Company, Milwaukee, Wis. H. H. Remple, Milwaukee, representing T. L. Smith Co.

Standard Oil Co., Broadway, New York.—Samples of asphalt. Cabinet of very fine enlarged photographs of construction. Representatives: W. D. Craven, Henry Fisher, R. L. Christie, New York; W. H. Leonard, manager road department, Chicago.

Steel Protected Concrete Co., Philadelphia, Pa.—Wainwright curb-bar. Representatives: Dr. H. A. Miner, Chas. Gueleick.

Tarrant Manufacturing Co., Saratoga Springs, N. Y.—Tar kettles, pouring pots, pumps, Macdonald open-hearth gratings. Representatives: W. R. Wilson, treasurer.

The Texas Co., 17 Battery Place, New York City.—Samples of Texaco asphalt; construction photographs. Representatives: W. A. Kershaw; P. A. Kennedy; R. E. Annis, Natick, Mass.; S. M. Christhilf, Baltimore; M. M. Cranston, Boston; J. J. Gartland, engineer; Harry B. Langan, New York.

The Thew Automatic Shovel Co., Lorain, O.—Photographs and literature. A placard gave the location of 34 Thew shovels in use in Philadelphia. Representatives: D. D. Deeds, H. A. McLaughlin.

Troy Wagon Works, Troy, O.—Troy bottom dumping wagon. Representatives: O. W. L. Coffin; F. R. Carr, Philadelphia.

Trussed Concrete Steel Co., Detroit, Mich.—Section of one-course concrete pavement, including sidewalk and curb, the latter being protected with Truss-Con protective steel bar. The roadway is reinforced with rib-metal expansion joints and steel wire mesh. Hy-rib metal reinforcement for culverts. Representatives: John Bouditch, Jr., Detroit; B. J. Sigmund, Philadelphia; J. Harris Butt, engineer.

Waring Underwood Company, Commercial Trust Building, Philadelphia, Pa.—Ideal Expansion Joint—a jointing material for pavements in which the felt portion is reduced to a minimum. Representative: H. W. Underwood, general manager.

Union Iron Works, Hoboken, N. J.—Tar tanks; Eldus oil distributor. Representatives: W. Schalscha, president; J. A. Johnson, sales manager.

United Gas Improvement Co., Philadelphia, Pa.—Samples of Ugite and photographs illustrating its use. Representatives: W. H. Fulweiler, I. G. Lewis; H. E. Haffner, highway engineer; Paul Thompson, vice-president.

United States Asphalt Refining Co., 90 West street, New York.—Samples of grades of Aztec asphalt for various purposes. Photographs of streets. Representatives: I. R. Draney, sales manager; G. L. Whitney, J. C. Rock, G. B. McGrath, T. M. Roche, Chicago; P. T. Weedon, D. C. Kochenderfer, M. F. Odell, New York; John McClave, E. P. Chicoine, Boston; J. S. Erwin, Gibsonburg, O.

United States Wood Preserving Co., 165 Broadway, New York. Samples of creosote and creosoted blocks and photographs. Representatives: H. S. Loud, Owen G. Struther, E. H. Goodrich, Syracuse.

Universal Road Machinery Co., Kingston, N. Y.—Reliance crusher, portable type, 10 by 18 inches opening; porcupine scarifier, weighing 4,600 pounds; Reliance street sweeper; stone screen showing patented reversing device to throw stone either way in bin. Representatives: S. H. Chauvenet, president; R. E. Leighton, general manager; A. R. Leighton.

Universal Portland Cement Co., Chicago, Ill.—Full sized section of concrete sidewalk, curbing and two-course concrete pavement. Representatives: J. L. Nelson, W. S. Wing; F. A. Brine; R. M. Carsten, Pittsburgh; J. H. Walker, W. L. Umstad; E. S. Hanson, advertising representative, Chicago; B. H. Rader, B. F. Affleck; J. P. Beck, manager publicity bureau.

Warner Quinlan Asphalt Co., 79 Wall street, New York.—Samples, photographs, lantern slides. Representatives: F. E. Kessler, M. Parkenheimer, J. Knight; J. H. Gallup, general manager, Syracuse.

Warren Bros., Boston, Mass.—Samples of bitulithic and Warrenite pavement; models; photographs; demonstration by screen tests showing coarse aggregate and dense mixture. Representatives: Earle W. Pimm, advertising manager; I. B. Safford; R. W. Turner, president Standard Bitulithic Co., New York; F. G. Cutter, assistant to president; E. Parker, general superintendent; R. B. Hoyt, New York; W. E. Shackleford, P. S. Kaull; J. M. Horne Wilmington, Del.; E. W. Powell; W. Stuart Smith, Rochester; M. T. Calef, Portland, Ore.

Warren-Knight Co., Philadelphia, Pa.—Surveying and engineering instruments. Representatives: J. A. Warren, president; F. A. Hertman, manager.

Waterloo Cement Machinery Corporation, Waterloo, Ia.—Little Wonder concrete mixer. Representatives: B. A. Vandergrift, C. H. Davis.

Watson Wagon Company, Canastota, N. Y.—A Watson trailer attached to an automobile tractor. Representatives: W. B. Pantall, Canastota; A. F. Pitts, sales manager, Pittsburgh; F. N. Harrington, sales manager, Philadelphia.

Wheeling Corrugating Co., 402 Broad street, Philadelphia.—Galvanized butt-joint culverts. Representative: J. O. Entrekin.

Wheeling Mold & Foundry Co., Wheeling, W. Va.—No. 2 portable rock crushing outfit. Representatives: Leroy Kling; J. C. Gorman.

Wiard Plow Co., Batavia, N. Y.—Contractors' plows with forged steel points.

Yellow Pine Manufacturers' Association, St. Louis, Mo.—Samples of long and short leaf yellow pine; full size sample of bridge pavement construction; special blocks and construction about car rails. Representatives: H. L. Collier, consulting engineer; E. C. Allen.

American Highway Association.

The American Road Congress, under which title the American Highway Association and the American Automobile Association hold their annual convention, will convene for the fourth time October 19-26 at Atlanta, Ga. Atlanta was selected after a contest among the leading cities. The experiment by Georgia of working the entire state convict force on the roads is expected to be of much interest to the delegates, while the holding of the convention in the south will, it is hoped, stimulate good roads movements in that section of the country. The 1915 congress will convene in the far west.

At the recent annual meeting of the directors of the American Highway Association Mr. Fairfax Harrison, who succeeded the late W. W. Finley as president of the Southern Railway, was elected vice-president of the association, to succeed Mr. Finley. He was also made a member of the executive committee.

At the meeting it was announced that the House committee on roads had invited representatives of the association to appear and make suggestions with regard to Federal aid. The policy of the association was described to the Congressional committee as being in favor of Federal co-operation in highway construction and maintenance.

Association of Engineering Societies.

The retiring secretary of the Board of Managers, Fred Brooks, announces that Joseph W. Peters, 3817 Olive street, St. Louis, Mo., will assume the position of secretary of the Board of Managers. His address will also be that of the publication office.

Quebec-Miami International Highway Association.

Howard D. Hadley, of Plattsburg, N. Y., was today re-elected president of the Quebec-Miami International Highway Association at its annual meeting held at Richmond, Va., Dec. 2. Other officers elected were: George A. Simard, Montreal, first vice president; N. M. Parrott, Baltimore, and Leonard Tufts, of Pinehurst, N. C., treasurer. President Hadley, in his report, explained that practically all of the highway has been constructed and that the various states through which it runs are endeavoring to have it properly patrolled.

PERSONALS

The following officers have recently been elected or appointed:

MASSACHUSETTS.

Chelsea—Mayor, Edward E. Willard.
Chicopee—Mayor, Frank A. Rivers.
Everett—Mayor, James Chambers.
Lawrence—Mayor, Michael A. Scanlon.
Lowell—Mayor, Dennis J. Murphy.
Melrose—Mayor, Oliver B. Munroe.
Newburyport—Mayor, Hiram H. Landford.
Newton—Mayor, Edwin O. Childs, Jr.
Woburn—Mayor, William H. Henchey.
Worcester—Mayor, George M. Wright.

(Continued on page 844.)

NEW APPLIANCES

THREE-TON TRUCK.

Built by Peerless Company Performs Variety of Services Winter and Summer.

An exceptionally wide and interesting variety of services is secured by the city of Boston from a three-ton Peerless truck which it has been operating for some time. In the winter the truck is equipped with a screw power hoist dumping body and used in garbage collection. In the summer the truck is equipped with a 900-gallon steel tank fitted with a rotary pressure pump and used interchangeably for sprinkling streets with water and oiling macadam roads.

It is the usual practice to use the truck for sprinkling and flushing the city streets on Sundays and on days when the macadam roads are not in fit condition for oiling. When it is in use as a sprinkler the truck travels 12 miles per hour and does the entire work on the routes formerly covered by three horse-drawn sprinkling carts.

Used as a road oiler the truck is driven at a speed of 8 miles per hour and covers 12,500 square yards of surface with a load of oil in 18 minutes. The oil is put on the road at 45 pounds pressure. In this service the truck accomplishes the work that was formerly done with six horses.

By means of a three-way valve the pressure pump may be used to fill the tank at the railroad siding, thus doing away with the hand pumps that were formerly used to fill the horse-drawn tanks.

The tank may also be fitted with a 2-inch hose for the purpose of extinguishing fires on dump piles or in places remote from water hydrants, and the pressure supplied by the pump is sufficient to throw the stream a considerable distance with much force.

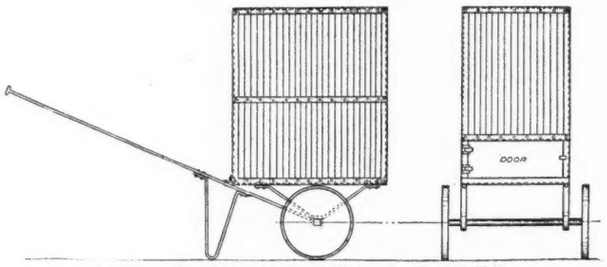
In the winter with the dumping body attached the truck travels an average of 40 miles a day making collections of ashes and refuse and accomplishes the work of four teams.

Portable Paper Burner.

The burning of paper and other combustibl rubbish at its source is the solution of a troublesome problem which has attracted the attention of officials of street cleaning departments at various times. As the cost of transportation to station where the paper can be baled is considerable, it would often be as well to dispose of the paper where collected and thereby stop all further expense. That the system is a practicable one is evidenced by the fact that many railroad companies at their terminals collect and burn in stationary incinerators located about the yards large quantities of paper.

A few years ago the Street Cleaning Department of New York City gave the system a trial. However, the crowded tenement districts where the incinerators were tried were not suitable fields for the proper operation of the plan. Complaints from smoke and danger of fires caused its abandonment.

Workmen with hand cart incinerators are used in Chicago. They are given definite routes which they cover regularly. However the burner in use proved too small for many articles which it was thought advisable to burn. Accordingly the Efficiency Division of the Civil Service Commission devised an incinerator shown in the illustration. The body and grate is raised above the axle about six inches to save it from injury.

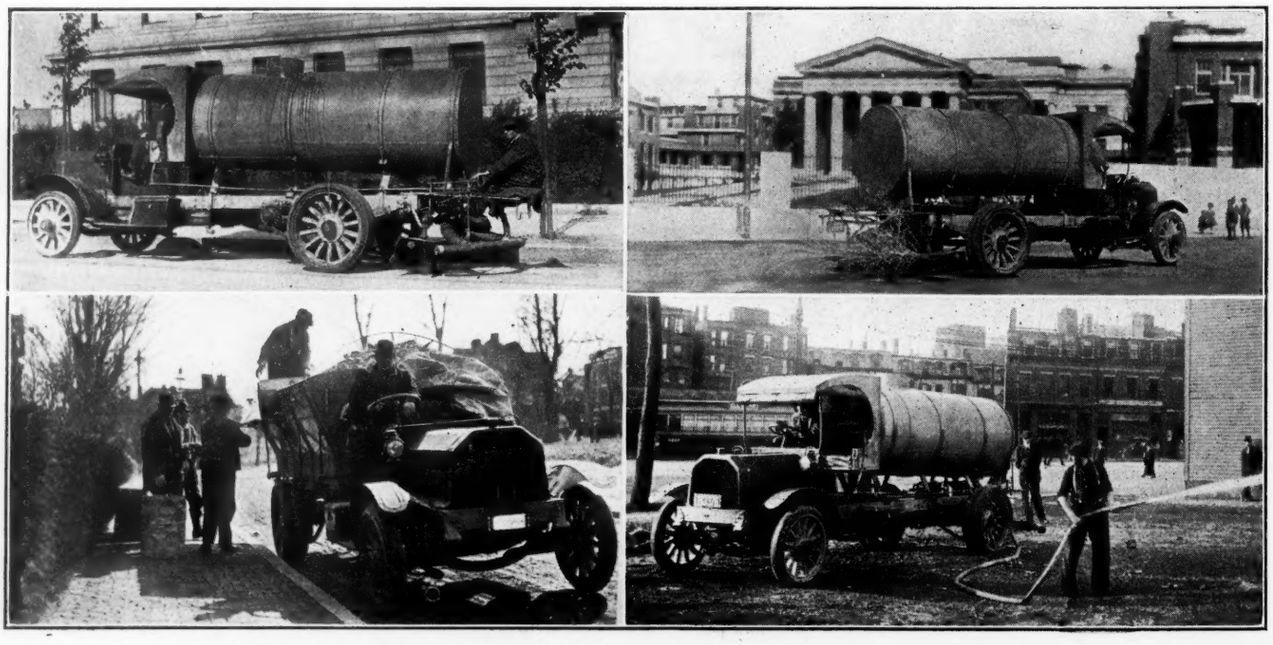


LARGE PORTABLE RUBBISH BURNER.

NYE PUMP.

New Model High Pressure Pump of Steam Vacuum Type Has Uniform Discharge Velocity, Hence Economy.

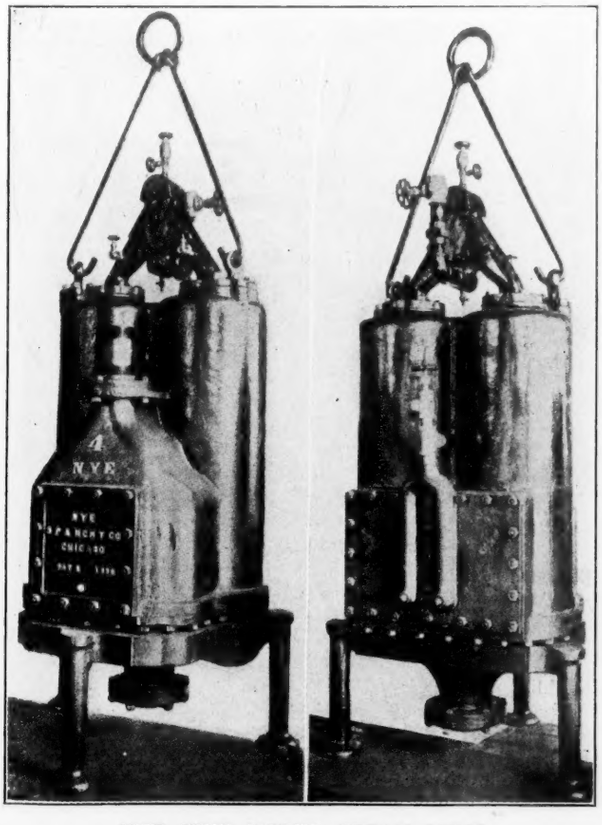
The Nye Steam Pump & Machinery Co., 701 North Western avenue, Chicago, Ill., in 1909 patented important improvements on their steam vacuum pump which was first placed on the market in 1869. The pump is adapted to draining the ground water from sewers and other excavations. It is simply suspended in the ditch with proper steam and water connections. Hence it can be moved along immediately in advance of the work and



VARIOUS USES OF ONE PEERLESS TRUCK OWNED BY CITY OF BOSTON.

the inconvenience of carrying water through underdrains, which often fill up, to distant sumps is avoided. When used on the drive well point system the pump is carried on the truck of the portable boiler and the suction connected with a horizontal leader to which the driven points are connected.

The Nye new model steam pump is simple in construction. A single couple of vertical cylindrical chambers, containing no pistons, forms the main body of the pump. On one side cast integral with the cylinders is a discharge chamber. On the opposite side is a plate embodying the new Nye patent priming attachment. The bottom of the three chambers is a flat bed plate, on its upper face the intake and discharge ports, underneath provided with intake and discharge passages cast integral. The cylinders are sealed off at the top by steam yoke connections, embodying the special Nye spray baskets. The steam yoke carries two original Nye features, a pair of air valves and a hollow steam valve that floats in its chamber. An oil cup provides a film of oil protecting the valve from injury. The original number of chambers reduced by elimination, with general arrangement similar is condensed (by integral casting) into the form shown in the illustration. It is claimed to be the lightest and most compact pump of its capacity. Special condensing and vacuum chambers are eliminated. Steam connection to the pump through a globe valve and two air valves form the entire adjustable control. An adjustable check valve for each cylinder forms the means of admission and control of cushion air and, once set, they are automatic. The extreme sensitiveness of this valve to the pressure, vacuum and its own weight, which are the operating mediums, is responsible to a large degree for the economy. Its function is the admission of steam to the filling cylinder in time to aid the air cushion, overcoming shock from ram action of the rising column. Following the cushioning function the valve admits steam for the discharge. Filling of the alternate cylinder cuts off the supply of steam, permitting expansion of the residual charge, thereby causing discharge from both cylinders simultaneously. The result of this lap of discharge is a sustained momentum. By this feature, it is stated, an unusual economy is effected, there being no loss of power through alternate losing and picking up of speed of the main column of discharge such as occurs in a pulsating flow.



NYE NEW MODEL STEAM PUMP.

CHASSIS OF TROY TRAILER.

TROY TRAILER CHASSIS.

Suitable for Use with Platform or Dumping Bodies on Trains.

The Troy Wagon Works Company, Troy, O., who for a number of years have manufactured a dumping car for use in trains behind traction engines, have placed on the market a chassis designed to carry any type of body as trailers for an automobile. As a matter of ordinary practice automobiles of three tons capacity are used. Over a fairly good level road an automobile can pull two five-ton trailers and should pull one over any road fit for motor traffic. In a general way the trailer differs from a car for a traction engine train in that it is built to carry its load at the high speed of auto trucks.

The length of this chassis is 14 feet 5 inches and the width, 7 feet ½ inch. The frame is 3 feet 5½ inches wide and 11 feet 10 inches long. The height from the ground is 2 feet 10½ inches. The wheelbase is 6 feet 9 inches. Height of wheels, 36 inches. Width of track from center to center of tires, 5 feet 4½ inches. The tires are steel, 4 inches by ¾ inch. Road clearance under axles 17 inches. Clear space between stearing bars, 4 feet 8 inches. The chassis weighs 3,300 pounds and has a carrying capacity of five tons. The frame is channel steel. Wheels are artillery type with hickory spokes.

The draw bar is connected to the main frame and not to the axles. The connection is made by passing a king bolt through a rigid draft beam in a perpendicular line with the center of the axle. The draw bar is telescopic, containing a coil spring which operates at pressures varying from 200 to 2,000 pounds. This, of course, is to give ease in traction and avoid shocks. The bars have special heads to act as bumpers between the trailers when operated in trains. The load is carried by four 3½-inch by 48-inch semi-elliptical springs. Both ends of the springs are shackled and each shackle is provided with a stop to prevent it from closing beyond a certain point.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago. Quotations: 4-inch, $27; 6 to 12-inch, $25; 16-inch and up, $24. Birmingham. Business is very dull. However, prices seem to remain steady, and as soon as money is obtainable by communities for water works extensions the pipe manufacturers expect a good business. Quotations: 4-inch, $22; 6-inch and up, $20. New York. Competition is keen for all business now coming up. Quotations: 6-inch, $22 to $23.

Lead.—Quotations: New York, 4c.; St. Louis, 3.85c.

New J. M. Office.—The Baltimore branch of the H. W. Johns-Manville Co. has been moved to 207 East Saratoga street, in the business center of the city. It will include offices, store and warehouse. A railroad switch runs into the building.

Safety Devices.—President F. A. Seiberling of the Goodyear Tire and Rubber Co., Akron, O., has formed a special organization to look after the prevention of accidents. At a meeting of one hundred and fifty factory foremen moving pictures were exhibited showing safety devices and the danger of their absence. A squad was organized to patrol the 41-acre factory constantly looking for dangerous operations, instructing workmen and suggesting safety devices.

Couple - Gear. — The Couple - Gear Freight-Wheel Co., Grand Rapids, Mich., recently received the following letter from John T. Mertz, chief of the Akron, O., fire department:

"Having attached the four-wheeled tractor furnished by your firm, I wish to advise you that it is certainly a pleasure to the writer to be able to make a report as to the performance of the tractor.

"Your Mr. L. V. Hudson gave us a demonstration to-day after the tractor was attached to our 65-foot aerial hook and ladder truck. We requested Mr. Hudson that he give us a demonstration of speed and climbing grades; to my surprise the tractor went up a 13 per cent grade when carrying a full complement of men and equipment and attached to the truck at the rate of 11 miles per hour, and the tractor propelled the truck on level streets with full complement of men and equipment at the rate of 26 miles per hour without any trouble or showing in the least any loss of power.

"We are more than pleased with the tractor in every way; the construction of the tractor is mechanically the finest and best I ever saw; the performance of the tractor was second to none and far above our expectations; and you can say for me that in my judgment you have solved the problem of converting horse-drawn steam fire engines and hook and ladder trucks of any fire department to self-propelled apparatus from a practical standpoint."

Care of Solid Tires.—Many motor truck owners have the idea that there is no limit to the ability of a solid tire to bear loads and so pile their cars high with "cargo" without any regard for their tires. Solid tires, however, are as sensitive to overloading as pneumatics, and R. G. Harris, head of the motor tire department of the Firestone Tire & Rubber Company, in the following sounds a warning of that tire abuse.

The immediate result of overloading a solid tire is the appearance of a bulge, called a "tractive wave," in the rubber just in front of the point of contact between tire and street. This wave, with the enormous weight back of it, works through to the very base of the tire.

No tires are made of pure rubber. The gum must be compounded with chemicals to give the desired wear-resisting qualities. The traction wave lessens the cohesive power of the compound and if not guarded against eventually will tear the tire away from the steel rim. Not only does the wave ruin the tire but it also affects the truck as though it were going up hill, involving a constant loss of power.

Several methods of preventing the separation of the tire from the channel have been devised. One is that of a hard rubber base vulcanized into the channel. The channel has a saw-tooth base, and the hard rubber filling these saw teeth and vulcanized into them becomes an integral part of the channel base. To this hard rubber in turn is vulcanized the tread.

A second method involves the use of a metal sub-base to which is dove-tailed and vulcanized a hard rubber base. To this hard base the tread is united. No channel is used in this type but side abrasion is prevented by an intermediate band projecting out on each side.

The side wire tire is the third preventive of tread separation. To endless retaining wires with flat sides are sprung over the edge of the rim and engage the ends of the cross wires which are flat on the upper side.

Whether or not tread separation is prevented, however, overloading remains injurious to the tire. The compound is crushed and sooner or later is broken down entirely.

Road Grader.—Charles Harris, Dowagiac, Mich., who is perfecting his claim for a patent on a road grader has decided to manufacture about twenty-five of these machines at once.

PERSONAL.

(Continued from page 841.)

Branchville, S. C.—Mayor, W. A. Dukes.

Gray Court, S. C.—Mayor, J. N. Leak.

Georgetown, S. C.—Mayor, W. H. Andrews.

Lancaster, S. C.—Mayor, J. M. Hood.

Rochester, N. H.—Mayor, Frank B. Preston.

Tunnel Hill, Ga.—Commissioners: Dr. W. J. Greene, A. L. Bandy, M. P. Massey, R. R. Clark and J. E. Moore.

Glenheulah, Wis.—President of village, Dr. E. J. Couch.

Commission governments have been inaugurated in Pennsylvania with the following officers:

Carbondale—Mayor, James B. Murrin; commissioners: Messrs. Burr, Davidson, Healy and Sahm.

Johnstown—Superintendent of public affairs, Mayor Joseph Cauffiel; superintendent of finance and accounts, Nathan Miller; superintendent of public safety, Enoch James; superintendent of streets and public improvements, H. H. Grazier; superintendent of parks and public property, John Berg.

Oil City—Mayor, Dr. Jacob B. Siggins; commissioners: D. J. Bolton, E. A. Steiderman, D. K. Johnston and A. R. Smart.

Wilkes-Barre—Mayor, John V. Kosek; commissioners: R. Nelson Bennett, Charles N. Loveland, Edwin B. Morgan and Joseph G. Schuler.

Franklin—Mayor, Dr. Fred W. Brown; commissioner of accounts and finance, E. J. Miller; commissioner of public safety, J. Howard Smiley; commissioner of streets and public improvements, John E. Ritchey; commissioner of parks and public property, Henry W. Lamberton; city controller and clerk to council, James G. Crawford.

Erie—Department of public affairs, Mayor W. J. Stern; department of finance and accounts, Cassius L. Baker; department of public safety, John C. Dundon; department of streets, Theodore Eichhorn; department of parks and public property, Frank E. Pelow.

Allentown—Mayor, Mr. Rinn; superintendent of the department of parks and public property, Robert J. Wheeler; superintendent of the department of streets and public improvements, Samuel D. Lehr; superintendent of the department of accounts and finances, Calvin E. Arner; superintendent of public safety, Chas. Spangler.

Chester—Mayor, William Ward, Jr.; superintendent of accounts and finances, Charles B. Mould; superintendent of public safety, Jonathan K. Hagerty; superintendent of streets and public improvements, Jos. Messick; superintendent of parks and public property, Wesley S. McDowell; also city clerk, John H. Mirkil; fire chief, L. E. Slater; superintendent of paving, Hugh Schlegel.

Auburn, N. Y.—Mayor-elect Charles W. Brister has announced his list of appointments as heads of departments to take office under the new administration on January 1: Commissioner of public works, Ransom R. Cross; commissioner of police, Major Edward S. Jennings; fire commissioner, William C. Burgess; park commissioner, Samuel E. Hillgren; health commissioner, Daniel L. Ramsay; commissioner of charities, LeRoy A. Phelps; comptroller, Maurice D. Richards; mayor's secretary, Frederick S. Parker. The following appointments have been made, subject to confirmation by the Common Council: City attorney, William S. Elder; city engineer, E. C. Aldrich.

Indianapolis, Ind.—Mayor-elect Bell has announced that he will make the following appointments: Members board of public works, Joseph A. Rink, James E. Troy and George B. Gaston; board of public safety, Albert Gall, Andrew H. Wahl and Robt. Metzger; chief fire department, J. Harry Johnson; city engineer, B. Y. T. Jeup; superintendent street department, Dennis J. Bush; superintendent street cleaning department, James G. Rochford.

Hamilton, O.—Director of public safety, C. E. Deneen; superintendent of gas works, Ed. Bevington; president of council, Walter Hinkel; city engineer, Frank Weaver, reappointed.

Fort Wayne, Ind.—Mayor-elect William J. Hosey has announced the following appointments: Board of public works—Robert E. Kelly, chairman; Frank E. Singrey and Henry Hilgeman; board of safety—George Herman, chairman; Will Kayser and Carl Reiman; board of health—Dr. H. O. Bruggeman, chairman; Dr. John H. Gilpin, secretary, and Dr. H. A. Duemling; board of park commissioners—D. N. Foster, chairman; Louis Fox, E. F. Yarnelle, Louis Dorn; city controller, Louis Schmoe; city engineer, Frank M. Randall; city attorney, Guy Colerick.

Saginaw, Mich.—A. R. D. Richardson has been elected mayor under the new commission form of government.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION
BIDS ASKED FOR

CONTRACTS AWARDED
ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO

STREETS AND ROADS

Fla.,	Ft. Myers	5 p.m., Dec. 20	Grading and paving streets with shell	D. W. Sumner, City Clk.
Ind.,	Greencastle	2 p.m., Dec. 20	Gravel roads, 8 miles	C. I. Airhart, Co. Aud.
N. J.,	Newark	3 p.m., Dec. 22	Asphalt block pavement	F. A. Reimer, Co Engr.
Wash.,	Bremerton	Dec. 22	Regrading concrete walks, etc., $5,500	J. C. Adams, City Engr.
Wash.,	Olympia	2 p.m., Dec. 22	Highway construction, 1¾ miles	J. W. Roberts, Sec. Hy. Bd.
N. J.,	Perth Amboy	8.30 p.m., Dec. 22	Two-inch asphalt block pavement	D. M. Adair, Str. Comr.
Ill.,	Cicero	8 p.m., Dec. 22	Brick paving	C. Jepsen, B. L. I.
Can.,	Vancouver, B. C.	11 a.m., Dec. 23	Pavements; estimated cost, $500,000	City Engr.
La.,	Ville Platte	Dec. 23	Concrete sidewalk and curb, 9,000 lin. ft	F. S. Roberts, City Engr.
O.,	Cleveland Heights	Dec. 23	Brick, asphalt, macadam, etc., number of streets	H. H. Canfield, Vil. Clk.
Neb.,	Omaha	9 a.m., Dec. 23	Paving and curbing portions of streets, 12 districts	T. J. Flynn, City Clk.
N. Y.,	Brooklyn	11 a.m., Dec. 24	Laying sidewalks, grading, paving and curbing	L. H. Pounds, Boro. Pres.
Wash.,	Port Angeles	Dec. 25	Road construction, cost $170,000	C. J. Fillion, City Engr.
Fla.,	Bartow	Dec. 29	Concrete sidewalk, 25,000 sq. yds	B. J. Oeland, City Clk
Fla.,	Tarpon Springs	Dec. 29	Hard surfaced highway	L. D. Vinson, Co. Comr.
Cal.,	Oakland	Dec. 29	Tunnel and highway; estimated cost, $250,000	City Council.
Wash.,	Olympia	2 p.m., Dec. 29	Clearing, grading, draining, bridging, 4 miles highway	W. J. Roberts, Sec. Hy. Bd.
Ind.,	South Bend	11 a.m., Dec. 29	Road construction	Comrs.
Del.,	Wilmington	noon, Dec. 30	Building two improved roads	Jas. Wilson, St. Hwy. Comn.
Pa.,	Pittsburgh	noon, Dec. 30	Filling and paving approaches to bridge	R. J. Cunningham, Co. Cont.
Va.,	Roanoke	Dec. 30	Macadamizing street	F. L. Gibboney, City Engr.
Ind.,	Portland	Dec. 31	Road improvement	Comrs.
N. C.,	Wilmington	noon, Dec. 31	Concrete curb, 14,500 lin. ft.; conc. sidewalk, 5,000 sq. yds.	Rapalje & Loughlin, Engrs.
O.,	Salina	Jan. 1	Macadam, 3 miles	R. D. Smalley, Co. Engr.
Tex.,	Mexia	Jan. 1	Paving, cost $80,000	H. S. Bennet, City Engr.
Ia.,	Waukon	7 p.m., Jan. 2	Vit. brick pavement, 21,000 sq. yds	J. D. Cowan, City Clk.
Ind.,	Hartford Ctiy	2 p.m., Jan. 5	Macadam road	Co. Aud.
Ind.,	Valparaiso	2 p.m., Jan. 5	Gravel road	Comrs.
Ind.,	Rensselaer	2 p.m., Jan. 5	Macadam road	Comrs.
Ind.,	Fowler	1 p.m., Jan. 5	Roads in seven townships	Comrs.
Ind.,	Williamsport	2 p.m., Jan. 5	Highway construction	Co. Comrs.
Ind.,	Vevay	1 p.m., Jan. 5	Highway construction	Co. Comrs.
Ia.,	Belle Plain	3 p.m., Jan. 5	Paving, 55,718 sq. yds.; cement curb, 13,570 ft	W. M. Ewen, City Clk.
Ind.,	Portland	Jan. 5	Gravel road	Comrs.
Fla.,	Clearwater	Jan. 5	Hard surfaced highway	C. W. Weicking, Clk.
Miss.,	Kosciusko	Jan. 6	Road improvement, 17 miles, gravel or crushed stone	W. B. Potts, Pres.
Ind.,	Monticello	Jan. 6	Road construction	A. G. Fisher, Aud.
Fla.,	St. Augustine	10 a.m., Jan. 6	Repair and upkeep of hard surfaced roads	W. W. Snow, Co. Aud.
Ind.,	Crawfordsville	10 a.m., Jan. 6	Gravel road	Comrs.
Ind.,	Wabash	1.30 p.m., Jan. 6	Gravel road improvements, 2 jobs	Co. Aud.
Ind.,	Shelbyville	10 a.m., Jan. 7	Road	Comrs.
Ind.,	Portland	Jan. 7	Construction of two roads	Comrs.
Ga.,	Savannah	Jan. 8	Furnishing cement gravel, 10,000 cu. yds	Co. Comrs.
O.,	Salina	Feb. 1	Macadam, 4 miles	R. D. Smalley, Co. Engr.
Ind.,	Laporte	Feb. 2	Brick paving; cost, $800	L. Drew, Engr.

SEWERAGE

Fla.,	Fort Myers	5 p.m., Dec. 20	Improvements to sewerage system	E W. Sumner, City Clk
Minn.,	St. Peter	Dec. 22	Rock sewer	City Clk.
Minn.,	St. Paul	2 p.m., Dec. 22	Sewers on eight streets	L. C. Seamers, Clk. B. P. W.
Ill.,	Manteno	2 p.m., Dec. 22	Main open ditch	Comrs.
N. J.,	Asbury Park	8 p.m., Dec. 22	Sea outlet	R. L. Savage, City Engr.
N. C.,	High Point	3 p.m., Dec. 22	12-inch outfall sewer, 1,800 ft; sewage disposal plant	F. M. Tate, Mayor.
O.,	Mt. Vernon	Dec. 22	Sewer system and disposal plant, $42,000	C. M. Fairchild, Dir.
Ill.,	Cicero	8 p.m., Dec. 22	Tile pipe sewer	C. Jepsen, Pres. B. L. I.
S. D.,	Sioux Falls	9 a.m., Dec. 22	Sewer connections	W. C. Leyse, City Aud.
Ind.,	Huntington	Dec. 23	Sewer and drainage system	City Council.
O.,	Cleveland Heights	noon, Dec. 23	Sewers	H. H. Canfield, Clk.
N. Y.,	Brooklyn	11 a.m., Dec. 24	Sewers	L. H. Pounds, Boro. Pres.
Ind.,	Wayne	11 a.m., Dec. 27	Tile drain	Bd. of Comrs.
Kans.,	Concordia	8 p.m., Dec. 29	Sanitary sewers, including 21,165 lin. ft. 8-15-in. vit. pipe	L. W. Lash, City Clk.
N. J.,	Bogota	8 p.m., Dec. 30	Vit. sewers, 4.4 miles; branches, manholes, etc.	H. P. Ross, Boro. Clk.
N. Y.,	Rochester	11 a.m., Dec. 30	Sewer in Woodbine Ave.	F. X. Pifer, Sec.
Ia.,	Muscatine	Dec. 30	Drainage pumping plant	Co. Aud.
Miss.,	Duncan	Jan. 1	Surface drainage	W. S. Bobo, Engr., Clarksdale.
O.,	Nelsonville	about Jan. 1	6 to 14-foot sanitary sewer; estimated cost, $85,000	Park Sniffon, Engr.
Kans.,	Atchison	Jan. 5	Tile sanitary sewer, 4,100 ft	F. S. Altman, City Engr.
La.,	New Orleans	Jan. 6	Pumps, 1 centrifugal, 11 screw; discharge pipes, gates, &c.	G. C. Earl, Gen. Supt.
N. J.,	Newark	2 p.m., Jan. 6	Main intercepting sewer	J. S. Gibson, Clk.
Miss.,	New Albany	8 p.m., Jan. 6	General sewerage system	S. W. Bevill, City Clk.
La.,	New Orleans	Jan. 30	Drainage canal work	F. S. Shields, Sec. Sew. Bd.
Wis.,	Fond du Lac	Feb. 15	Vit. pipe sewer, 1½ miles, 8 to 18-inch	J. F. Hohensee, City Clk.

WATER SUPPLY

Fla.,	Mt. Myers	5 p.m., Dec. 20	Improving water works system	E. W. Sumner, City Clk.
Miss.,	Jackson	Dec. 20	Mechanical filtration plant	Mayor.
N. C.,	High Point	3 p.m., Dec. 22	Concrete lined water basin, 3,000,000 gal	F. M. Tate, Mayor.
Pa.,	Coatesville	Dec. 22	Concrete dam and reservoir	A. Potter, Cons. Engr.
S. D.,	Sioux Falls	9 a.m., Dec. 22	Construction of water connections	W. C. Leyse, City Aud.
Brazil,	Therezopolis	Dec. 23	Water works and sewage systems	Municip'l Cham., Therezopolis.
O.,	Cleveland Heights	Dec. 23	Water main, 6 and 8 inch	H. H. Canfield, Clk.
N. Y.,	Schenectady	2.30 p.m., Dec. 24	Furnishing, laying 36-inch water main, 18,000 ft	Bd. Con. & Sup.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES
Md.,	Baltimore	Dec. 24.	Furnish and laying of steel or reinforced concrete distributing mains	E. B. Whitman, Water Engr.
N. Y.,	Schenectady	Dec. 24.	36-in. water main, 18,000 lin. ft.	City Clerk.
Fla.,	Baltimore	11 a.m., Dec. 24.	High duty air compressor for waterworks	C. B. Eggert, City Clk.
N. Y.,	Mount Morris	2 p.m., Dec. 29.	Supply main and reservoir	J. Aubery, Vil. Clk.
N. Y.,	Ogdenburg	3 p.m., Dec. 29.	Water softening plant	State Hosp. Comn., Albany.
Fla.,	Pensacola	2 p.m., Dec. 29.	Air compressor	A. Greenhut, Mayor.
Kans.,	Scott City	Dec. 30.	Sinking well, installing pump and engine	State Bd. Irig.
N. Y.,	Williamson	Jan. 1.	Water works, cost $70,000	H. C. Kittredge, Engr., Rochester.
Kans.,	Lakin	Jan. 1.	Digging of artesian well	Kearney Co. Comrs.
Ind.,	Mitchell	About Jan. 1.	Water and electric light plant	A. H. Kennedy, Rockport.
La.,	New Orleans	noon, Jan. 6.	Pumps and other water supplies	F. S. Shields, Sec. Sew. & Wat. Bd.
Ill.,	Winchester	7.30 p.m., Jan. 6.	Waterworks system	Fuller Coult Co., Engrs., St. Louis, Mo.
Mont.,	Columbus	Jan. 12.	Water works	G. A. Westover, Twn. Clk.
Ia.,	Winfield	About Jan. 15.	Water system	J. O. Kilbourne, City Clk.
Neb.,	Bruning	Jan. 15.	Water works	G. G. Bruckert, Vil. Clk.
Pa.,	Coatesville	8 p.m., Jan. 15.	Reinforced concrete dam and reservoir, sand filter plant and conduit, 13,900 ft.	A. Carmichael, Pres. Council
Can.,	Toronto	noon, Jan. 20.	Filtration plant	H. C Hocken, Mayor

LIGHTING AND POWER

Ill.,	Chicago	11 a.m., Dec. 20.	12,000 incandescent gas lamps; 7,000 incandescent gasolene; 1,000 incandescent tungsten electric	R. Palmer, City Elecn.
Fla.,	Fort Myers	5 p.m., Dec. 20.	Horizontal turbine pump	E. W. Sumner, City Clk.
Mo.,	St. Louis	Dec. 20.	Conduit and wiring system	O. Wenderoth, Supv. Arch., Washington, D. C.
Ga.,	Atlanta	11 a.m., Dec. 20.	Lighting fixtures and lamps	S. Smith, Ch. Road Comn.
Mass.,	Springfield	Dec. 22.	Electrical work	Com. City Council.
Can.,	Yorkton	Dec. 22.	500 D. H. P. combined unit	M. M. Inglis, Elec. Engr.
N. C.,	High Point	3 p.m., Dec. 22.	Two electric centrifugal pumps, 1,000 gal. per min.	F. M. Tate, Mayor.
Ill.,	Chicago	11 a.m., Dec. 22.	Arc light carbons, copper coated, solid, etc.	R. Palmer, City Elec.
Pa.,	Wilkes-Barre	8.15 p.m., Dec. 22.	Lighting streets and alleys, 5 years	W. F. McHugh, City Clk.
Ill.,	Chicago	11 a.m., Dec. 23.	6,000 wire filament lamps; 2,500 tungsten lamps	City Elec'n.
N. J.,	Metuchen	8 p.m., Dec. 23.	Street lighting for five years	H. S. Wilson, Bor. Clk.
Wash.,	Seattle	10 a.m., Dec. 26.	Constructing steam electric power plant	C. B. Bagley, Sec. Bd. P. W.
D. C.,	Washington	Dec. 27.	Conduit & lighting fixtures, Post Office, Macomb, Ill.	Supv. Arch.
Ind.,	Indianapolis	10 a.m., Dec. 29.	Lighting and heating Soldiers' Monument	G. B. Menzies, Pres.
D. C.,	Washington	Dec. 30.	Electric furnaces	Bur. of Supplies, Navy Dept.
Pa.,	Philadelphia	10 a.m., Dec. 31.	Pump and motor	Co. Comrs.
Pa.,	Philadelphia	noon, Dec. 31.	Electric light fixtures, etc.	E. L. Tustin, Recorder.
Can.,	Calgary	5 p.m., Dec. 31.	200 k.w. traction motor generator, switchboard, etc.	T. L. Trumbull, Cons. Engr.
Ind.,	Mitchell	About Jan. 1.	Electric light plant	A. H. Kennedy, Rockport.
Minn.,	Walker	2 p.m., Jan. 2.	Power plant	C. H. Johnson, Arch., St. Paul.
D. C.,	Washington	3 p.m., Jan. 2.	Lighting fixtures, etc., at Brigham City, Utah	Supv. Arch.
Neb.,	Bruning	Jan. 15.	Lighting plant	G. G. Bruckert, Vil. Clk.
Ga.,	Atlanta	Jan. 20.	Lighting fixtures and lamps	Co. Comrs.
La.,	New Orleans	noon, Jan. 30.	Electrical machinery, drainage canal work	G. G. Earl, Gen. Supt.

FIRE EQUIPMENT

Wash.,	Everett	Dec. 22.	Motor triple combination apparatus	City Clk.
Wash.,	Seattle	Dec. 26.	Four combination motor pumping engines and hose cars; two 2-wheel front drive tractors	C. B. Bagley, Sec. Bd. P. W.
N. Y.,	New York	3 p.m., Dec. 29.	Fire alarm system in hospital	State Hosp. Comn., Albany.

BRIDGES

N. Y.,	White Plains	11 a.m., Dec. 22.	Two-leaf bascule lift bridge	H. G. Green, Clk. Bd. Supv.
Mont.,	Great Falls	Dec. 22.	Pratt truss highway bridge, two span	U. S. Reclamation Serv.
O.,	Akron	Dec. 22.	Substructure of bridge	C. L. Bower, Co. Clk.
Ariz.,	Wickenburg	10 a.m., Dec. 22.	Reinforced concrete bridge	Jas. Miller, Jr., Clk. Bd.
S. D.,	Elk Point	noon, Dec. 23.	Steel, concrete and wood bridges	Ed. Holden, Co. Aud.
Tex.,	Dallas	2 p.m., Dec. 23.	Concrete bridge, 200 ft. long	T. Bartlett, Cons. Engr., San Antonio.
Mo.,	Joplin	Dec. 30.	Concrete viaduct	W. T. Brooks, Engr, Kansas City.
O.,	Hamilton	Jan. 1.	Concrete or steel bridge, 650-ft. span	F. Hemmerl, Engr.
Miss.,	Kosciusko	Jan. 5.	Bridges and culverts, probably concrete	Highway Comrs.
S. D.,	Desmet	1 p.m., Jan. 6.	Steel or reinforced concrete bridges	W. M. Look, Co. Aud.
S. D.	Woonsocket	noon, Jan. 6.	Steel and concrete bridges for 1914	J. Kingsburg, Co. Aud.
S. D.,	Aberdeen	Jan. 6.	Six bridges	Co. Comrs.
S. D.,	Canton	Noon, Jan. 7.	Bridges and culverts during 1914	T. O. Torbison, Aud.
Iowa,	Charles City	noon, Jan. 7.	Bridges and culverts	H. B. Rosencranz, Co. Aud.
Miss.,	Batesville	Jan. 7.	Reinforced concrete bridge	J. B. Carothers, Clk.
S. D.,	Clear Lake	2 p.m., Jan. 8.	Steel and concrete bridges	A. L. Larsen, Co. Aud.

MISCELLANEOUS

D. C.,	Washington	3 p.m., Dec. 20.	Extension & remodeling customhouse at St. Louis Mo.	O. Wenderoth, Supv. Arch.
Minn.,	Carlton	10 a.m., Dec. 22.	Two-story jail and sheriff's residence	A. R. Norman, Co. Aud.
Can.,	Hanover, Ont.	Dec. 22.	Erecting public building	R. C. Desrochers, Sec. D. P. Wks., Ottawa.
Fla.,	Jacksonville	3 p.m., Dec. 22.	Unloading platform	Ch. Engr.
Fla.,	Jacksonville	8 p.m., Dec. 22.	Filling in back of bulkhead, about 40,000 cu. yds.	F. Richardson, Ch. Bd. Bond Trustees.
N. C.,	High Point	3 p.m., Dec. 22.	One fireproof pump house; one concrete valve house	F. M. Tate, Mayor.
D. C.,	Washington	Dec. 23.	11,000 ft. cable; 10,000 twin conductor wire	Bur. of Supplies, U. S. N.
Mass.,	Holyoke	2 p.m., Dec. 26.	Ammonia still building	Mgr. Gas & Elec. Dept.
D. C.,	Washington	10.30 a.m., Dec. 26.	Wire cable, steel and iron pipe, etc.	Maj. F. C. Boggs, Gen. Pur. Off.
Ill.,	Chicago	11 a.m., Dec. 26.	Bridge scrap brass, 30 tons	L. E. McGann, Comr. P. Wks.
Can.,	Toronto	Dec. 27.	Water proofing eight subways	B. Ripley, Engr.
Can.,	Ottawa	4 p.m., Dec. 29.	Constructing dam	R. C. Desroches, Sec. D. P. W.
N. Y.,	Poughkeepsie	3 p.m., Dec. 29.	Coal and ash handling apparatus.	J. H. E. Hanify, Sec., Albany.
N. Y.,	New York	Dec. 29.	Subway	Pub. Serv. Comn.
Can.,	Vancouver	Dec. 29.	Erecting hospital	R. C. Desroches, Ottawa.
Ill.,	Chicago	2 p.m., Dec. 29.	Rubber tires, Inner tubes, etc.	Gen. Supt. Police, City Hall.
Cal.,	Richmond	Dec. 29.	Harbor work	City Clerk.
D. C.,	Washington	10.30 a.m., Dec. 30.	Galvanized conduit, copper condenser tubes & chemicals.	Maj. F. C. Boggs, G. Pur. Off.
Cal.,	Mare Island	10 a.m., Dec. 30.	Brass and copper pipe and tubing	P. J. Cowie, Paym. Genl. U. S. N., Washington.
Ky.,	Taylorsville	Dec. 31.	Fireproof court house	S. K. Baird, Co. Judge.
O.,	Cleveland	Jan. 1.	Four-story hospital, cost $150,000	Trus. St. John's Hospital.
Ill.,	Chicago	noon, Jan. 5.	Rapid transit subways	E. Block, Ch. Trans. Com.
Can.,	Megantic, Ont.	Jan. 5.	Concrete dam	J. Ray, Clk.
D. C.,	Washington	11.30 a.m., Jan. 5.	Bells, fuses, telephone condensers, etc.	Maj. W. L. Clark, Dis. Off., U. S. A.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
S. D.,	Flandreau	2 p.m., Jan. 6	Court house	G A Chorpening, Co Aud
Colo.,	Grand Junction	3 p.m., Jan. 6	U. S. Post Office	O. Wenderoth, Washington, D. C.
Miss.,	Pass Christian	Jan. 6	Shell crusher	City Council.
O.,	Salem	3 p.m., Jan. 7	U. S. Post Office	O. Wenderoth, Supv. Arch., Washington, D. C.
Can.,	Ottawa	Jan. 8	Heating and ventilating post office building	R. C. Desroches, Sec. D. P. W.
Ga.,	Atlanta	11 a.m., Jan. 20	Metal nling devices, furnishing court room equipment	S. Smith, Ch. Com. Roads.
Can.,	Ottawa	4 p.m., Feb. 3	About 85 miles welded steel pipe	City Clerk.

STREETS AND ROADS

Anniston, Ala.—It is considered very probable that during their present session Calhoun County Road and Revenue Commissioners will award contract to extend government state aid road out of Piedmont all way from that city to Jacksonville, distance of 12 miles.

Birmingham, Ala.—Ordinance has been passed to provide for certain improvements on Hayes St., from Heflin Boulevard to west boundary of Section 4, Township 18, Range 3, and at highway intersections between said points.

Mobile, Ala.—On Dec. 29 good roads bonds in sum of $200,000 will be sold.

Galt, Cal.—Surveys are being made at Galt, Sacramento County, for construction of many blocks of new sidewalks.

Oakland, Cal.—City Council has passed ordinances appropriating money out of Public Betterment Fund to pay for street work in front of property owned by municipality. Sum of $2,039.13 has been appropriated for work in 25th Ave., between East 26th and East 27th Sts., while the work in front of its property in Ohio St., between Cottage and Prince Sts., will cost $1,804.37.

Oakland, Cal.—Commissioners have adopted plans and specifications for improvement of Harrison St., between 19th and 20th Sts.

Pasadena, Cal.—Question of paving South Wilson Ave. is being considered.

Bridgeport, Conn.—State Highway Commissioner has received sealed bids for various sections of road work, and more than fifty were received. Contracts, which will be awarded during latter part of the week, are for following work: In town of Avon, about 6,230 linear feet of native stone macadam construction; in Canton, about 9,077 lin. ft. of gravel or native stone construction; Granby, about 7,173 lin. ft. of native stone or trap rock macadam construction; North Stonington, about 3,645 lin. ft. of gravel construction; Norwich, about 1,140 lin. ft. of macadam construction; Plainfield, about 1,230 lin. ft. of gravel construction; Bethany, about 7,460 lin. ft. of gravel construction.

Bridgeport, Conn.—Housatonic Ave., from East Washington Ave. and for a distance of one block to north of that avenue, is to be widened for distance of 10 ft. if Board of Aldermen act favorably on report of Streets and Sidewalks Committee, which will be submitted at that meeting.

New London, Conn.—At special city meeting it was unanimously voted to appropriate sum of $10,000 for purpose of extending Tenth St. by construction of overhead bridge for foot passengers and vehicles.

Gainesville, Fla.—A mass meeting has been held by Chamber of Commerce and election for purpose of issuing several hundred thousand dollars for building additional good roads in this county was unanimously approved. Another mass meeting will be held Saturday, Dec. 20, to definitely settle the matter.

Jacksonville, Fla.—Bond issue of $150,000 for roads and bridges have been carried.

Jacksonville, Fla.—A new improvement that will mean much to city of Jacksonville will be paving of Julia St. from Bay to Forsyth Sts. with Tarvia on present brick.

Jacksonville, Fla.—Plans have been approved for extension of Hogan St.

Milton, Fla.—Paving of streets is being discussed.

Port St. Joe, Fla.—Bonds in sum of $10,000 have been voted for paving and beautifying the streets.

Sarsota, Fla.—The Manatee Co. Bd. of Comrs. has called election for Jan. 12 to vote on proposed bond issue of $425,000 for roads and bridges. If successful this will mean extension of Bayshore Blvd. plan from Tampa south through Hillsborough Co., connecting near Gillette wtih Manatee Co. system to run through Palmetto, over broad Manatee River on $110,000 bridge, through Bradentown and Sarasota, south of which will be two branches. One will go on down shore to Venice and other across Sarasota Bay to gulf on Sarasota Key.

Tavares, Fla.—Bonds in sum of $500,000 have been voted for improvement of highways.

Bloomington, Ill.—City Engineer Folsom has been instructed to prepare plan and estimate for brick pavement on Mill St., from Center St. west to east entrance of St. Joseph's Hospital.

Dixon, Ill.—City Council will probably ask for approval of voters to bond of $30,000 next spring to complete paving outlined. Bond issue to pay city share of improvements, estimates of which are as follows: Brick pavement on Depot Ave., from Third St. to Northwestern Depot, $22,200.77; brick pavement on College Ave., from Third St. to Sixth St., and on Sixth, from College Ave. to Depot Ave., $13,742.04; brick pavement on River St., from Galena Ave. east to city limits, about $20,000. In addition to above the board is considering paving of East Second St.

East Alton, Ill.—East Alton Village Council has ordered macadam crossings for path from Clark corner to C. & A. cut off tunnel and for path leading from Chessen building towards school house.

Edwardsville, Ill.—County Board has voted that first highway in county to receive state aid should be Old Milton Road, which extends eastward out of Alton, towards Granite City and Edwardsville. It will be improved as far as appropriation will allow.

Galesburg, Ill.—A company to build concrete highway costing $3,500,000 from Chicago to St. Louis has been formed by R. D. Moore, A. B. Peckenpaugh, N. T. Allen and Fred Peterson, who procured necessary license. Promoters say road will go through Cook, Will, Kankakee, Iroquois, Ford, McLean, DeWitt, Macon, Sangamon, Montgomery, Madison and St. Clair counties.

Streator, Ill.—Resolution has been adopted for construction of two main roads through county, to be of either brick or concrete.

Evansville, Ind.—Highway bonds in sum of $14,800 will be sold on Dec. 15. Bids are being received by Co. Aud.

Fort Wayne, Ind.—Opening of Sherman St. from Pope Ave. to High St. is being planned.

Fort Wayne, Ind.—Petition has been filed with County Commissioners by number of residents of Marion Township, asking for stoning of seventeen miles of roads in that township.

Indianapolis, Ind.—A resolution setting forth work to be done in north park district next year under proposed assessment of approximately $100,000, will be adopted by Board of Park Commissioners. Resolution will contemplate paying for ground needed for boulevard purposes along north bank of Fall Creek from 34th St. to bridge across Fall Creek near state fair ground. It will also contemplate construction of levee that will be required for building of boulevard along north bank of stream from 30th to 38th St.

Indianapolis, Ind.—Plans are being prepared by Board of Park Commissioners for paving 34th St., from Illinois St. to Crown Hill cemetery. Bids will be asked on two kinds of paving—concrete and asphaltic concrete. Construction work is not to be started until next spring.

Rockville, Ind.—Highway improvement bonds in sum of $4,765 will be sold at 1 p. m., Dec. 20, by T. H. Rush, Treasurer Parke County.

South Bend, Ind.—Extension of No. William St. is being discussed.

Lawrence, Kan.—Resolutions have been adopted for paving of Pinckney St. and Rogers Ave. F. D. Brooks is City Clk.

Lawrence, Kan.—Resolution has been adopted for grading, curbing and paving of Conklin St. F. D. Brooks is City Clerk.

Lexington, Ky.—Resolution has been adopted for improvement of Angliana Ave., from Broadway to Versailles Pike. J. J. O'Brien is City Clerk.

Paducah, Ky.—Board of Viewers which County Judge James M. Lang appointed to investigate advisability of opening road between High Point and Metropolis roads, to be known as the John Bobo road, has made final report. Board has recommended that road be built and that work be begun by county early in 1914. It wil be built by county and property owners jointly.

Whiteburg, Ky.—People of new city of Jenkins, in this county, and people of Dickerson County, Va., propose building 20 miles model highway from Clintwood to Jenkins through rough section of Cumberland Mountains, arrangements having already been made for early construction of model roadway.

Boston, Mass.—Council has passed loan order for $48,000 for extension of East First St., South Boston.

Owosso, Mich.—Dissatisfied with road building in this county under county road system with three commissioners in charge, Owosso Improvement Association has named committee of five to devise plan for more satisfactory system.

St. Paul, Minn.—Except for block between Lexington Ave. and Dunlap St., where grade is too steep to permit use of blocks, Selby Ave., from Victoria St. to Herschel Ave., will be paved with creosoted blocks, according to decision reached by Board of Public Works. Engineer's figures estimate cost of paving Selby Ave. with creosoted blocks at $74,908.47, and cost to property owners about $4.78 a foot.

St. Paul, Minn.—Plans, specifications and estimates of improvements to be made on parkways and boulevards by park board next spring are being prepared by City Engineer Claussen, and probably will be ready for detailed consideration at next meeting of board January 1. Four big improvements planned are Mounds and Johnson boulevards, connecting downtown district with Mounds and Phalen parks, and Prospect and Cherokee Heights boulevards on west side.

St. Paul, Minn.—Paving of Prior Ave. from Marshall to University Aves. with creosoted blocks, as provided at hearing before Bd. of Pub. Wks., will cost $36,714.21, according to estimate of city engineer. Front foot cost will be approximately $6.74. Another estimate by City Engr. fixes cost of paving Hastings Ave., from Bates Ave. to Earl St., with creosoted blocks at $21,500, or approximately $4.70 a front foot. Final orders for improvement of these two streets, as well as University Ave. and Ninth St. will probably go to Assembly at once.

Chillicothe, Mo.—Construction of rock roads in county is being urged by State Highway Commissioner.

Chillicothe, Mo.—If present plans of Col. Frank Buffum, State Highway Commissioner, are carried out, Chillicothe will be on three more state highways. Three proposed highways are as follows: First—Highway will start from Omaha, Neb., to Chillicothe, where it will take up the Cross-State Highway and east passing through Brunswick, Moberly and other towns to Montgomery City, thence into St. Louis. Second—Highway will start at Brunswick, running northwest through Chillicothe, Gallatin, Pattonsburg, Albany, Maryville to Tarkio. Third—Highway will start at Kansas City, passing through Excelsior Springs, Lawson, Braymer, Chillicothe, Laredo and on into Cedar Rapids, Iowa, where it will join the Red Ball route running into St. Paul.

Manchester, N. H.—Baker St. will be macadamized by Board of Public Works from Willow St. to tracks of Manchester and Lawrence railroad.

Asbury Park, N. J.—Finance Chairman Winan's $122,000 refunding bond ordinance for Kingsley St. paving cost has passed first reading.

Asbury Park, N. J.—Bids for completion of Oak Bluff Ave. improvement will likely be asked by Council.

Camden, N. J.—Boulevard from Broadway to Haddon Ave., along Atlantic Ave., has been recommended.

Flemington, N. J.—In accordance with resolution adopted by Common Council, special election will be held Dec. 23 to vote on question of having Flemington-Frenchtown macadam road enter Main St. through Capner St.

Jersey City, N. J.—The revised plans for widening of Summit Ave. and Sip Ave., from Pavonia Ave. to Bergen Ave., have been completed.

Jersey City, N. J.—Specifications have been adopted for proposed paving of Concord St., from Hoboken Ave. to Fleet St., with brick on concrete foundation.

High Point, N. C.—Street extension and paving are under consideration.

Long Branch, N. J.—Resolution has been adopted at meeting of Board of Commissioners asking State Utility Commission to take up question of paving between trolley tracks with brick in order to preserve present pavement just completed.

New Brunswick, N. J.—By resolution of Board of Frecholders all bids recevied for paving first section of Roosevelt-Woodbridge road have been ordered rejected, and accompanying checks returned to various bidders.

Trenton, N. J.—Ordinance authorizing bond issue of $24,000 to cover cost of repaving West State St. and paving of Parkside Ave. has been passed.

Auburn, N. Y.—E. C. Pooler of Cato, chairman of Highway Committee, will present to Board of Supervisors report favoring county system of water-bound macadam highways.

Binghamton, N. Y.—An attempt will be made to widen entrance of Commercial Ave. at its junction with Court St.

Bridgewater, N. Y.—Contract will shortly be awarded for proposed state highway through Bridgewater.

Hudson, N. Y.—Paving of streets in front of Court House is being considered.

Patchogue, L. I., N. Y.—Resolution has been passed directing supervisor to include sum of $71,000 in town budget for roads. It was also ordered to divide town into fifteen road districts, one man to each district.

Riverhead, N. Y.—Bonds in sum of $17,000 have been voted for road improvements.

Rome, N. Y.—Notice is given that on 15th day of Dec., 1913, at 10 o'clock a. m., A. L. MacMaster, City Clerk, will offer at public sale, City of Rome paving bonds, in aggregate principal sum of $6,533.31.

Voorheesville, N. Y.—Many improvements are being urged by Village Board of Trade. Among these are building of flagstone sidewalks along Main St. and Fowler Ave. and through West Shore Park near railroad station.

Wampsville, N. Y.—Resolution has been introduced asking State Highway Department to appropriate sum not exceeding $40,000 to resurface crown and ditch Canastota-Peterboro stone road.

Dobson, N. C.—Dobson Township will shortly hold election to vote special tax for road improvement.

Dayton, O.—Petition for establishment of new roadway through Mad River and Harrison Twps. has been filed with Co. Comrs.

Kennedy Heights, O.—Bids will be received by Clerk of the Village at office of O. W. Bennett, attorney for village, 711 Fourth National Bank Building, Cincinnati, O., until 12 o'clock noon, Dec. 20, 1913, for purchase of 10 coupon bonds in sum of $4,715 98-100 for improvement of number of streets by construction of artificial stone sidewalks. H. Appleton is clerk.

Massillon, O.—State Highway Comr. J. H. Marker is to visit Stark Co. in near future for conference on question of paving Canton-Massillon Rd. County will pay $85,000 next year to road fund, 25 per cent. of which will go for main market roads, unless effort to divert this sum to Canton-Massillon Rd. project is successful.

Springfield, O.—Resolution has been passed amending ordinance for paving of monument Square. Amendment leaves open material to be used. Original petition specified wood block.

Toledo, O.—Ordinance has been adopted for bond issue of $98,000 for improving East Broadway.

Youngstown, O.—In order to provide funds for building of roads during year 1914, good roads commissioners have decided to issue bonds for $100,000, payable in 20 years and bearing five per cent. interest. Bonds will be sold Jan. 9.

Eugene, Ore.—Six bidders sought two issues of street improvement bonds, totaling $32,050, contracts for which were let by City Council to William E. Sweet & Co. of Denver, at a premium.

Grant Pass, Ore.—Petitions are being circulated throughout county asking that County Court fix date for purpose of voting bond issue of $225,000 for permanent roadways. Josephine County has 30 miles of Pacific highway that will be brought to high standardization as soon as funds are available.

Marcus Hook, Pa.—Ordinance has been adopted for paving of roadway of McClenachan Terrace from Post Rd. northwardly to 11th St.

York, Pa.—Calvin A. Boyer, Supt. of Dept. of Sts. and Pub. Impts., under new city government, and City Engr. George A. Warner are planning making improvements on city highways before winter.

Waynesboro, Pa.—Borough Council has decided to pave Cleveland Ave., from Main St. to and including first alley south.

Woonsocket, R. I.—Number of petitions for concreting of sidewalks and for curbing have been received by Board of Aldermen and all have been referred to Aldermanic Committee on Streets and Bridges.

Greenville, S. C.—Street Department has asked for $21,600 appropriation for various street works, and $10,800 for street improvements.

Hendersonville, S. C.—About $70,000 worth of good roads bonds have been sold in Henderson County and funds are now available. County Commissioners and Road Supervisors have authorized purchase of sand dredge and a traction engine. Sand-clay process of road building will be followed and work will be done on highways on which property owners furnish sand from their creeks.

Bristol, Tenn.—A fourth bond issue for good roads will probably be voted by Sullivan County Court in January. Sullivan County is winding up expenditure of $500,000 for new roads and it has been found that at least $100,000 more is needed to complete present system of highways.

Bristol, Tenn.—Bond issue of $150,000 for two new roads across Johnson County, Tenn., has been asked in resolution adopted at a big good roads meeting held

Olympia, Wash.—Following are bids received for Sunset Highway, Douglas County, Wenatchee Northerly. Names of bidders and totals of bids as follows: (a) Pugh & Arenz, Monroe, Wash., $34,147.81; (b) Guthrie, McDougall Co., Portland, Ore., $32,074.44; (c) Quigg Construction Co., Wenatchee, Wash., $27,069.60; (d) John Mohr, Waterville, Wash., $28,099.92; (e) Sloane Bros., Seattle, Wash., $28,711.37; (f) Rajatte & Fobert, Seattle, Wash., $26,968.10; and (g) Henry Styles, Tacoma, Wash, $31,178.73.

Items.	Unit Bid. (a)	Unit Bid. (b)	Unit Bid. (c)	Unit Bid. (d)	Unit Bid. (e)	Unit Bid. (f)	Unit Bid. (g)
60,636 cu. yds. common excavation, including haul of 400 ft.	$0.31	$0.27½	$0.25	$0.22	$0.22	$0.22	$0.28
4,322 cu. yds. loose rock	.65	47	.40	.45	.60	.39	.45
4,903 cu. yds. solid rock	1.00	1.10	.90	1.25	1.00	.90	.95
Common borrow, per cu. yd.	.40	.27½	.30	.22	.27	.22	.30
Loose rock, per cu. yd.	.75	.47	.50	.45	.75	.39	.50
53,790 cu. yds. overhaul on any of above materails, per each 100 ft.	.03	.02	.00	.03	.01½	.02	.02
Rip rap, loose, per cu. yd.	1.75	1.50	.20	.65	2.00	.39	1.50
Rip rap, hand placed, per cu. yds.	2.25	2.00	.75	1.00	3.00	1.25	2.50
Slope wall, per cu. yd.	.50	2.50	1.75	2.75	4.00	1.25	2.50
Rubble masonry, per cu. yd.	2.00	12.00	1.50	5.50	7.00	1.75	4.00
52.6 cu. yds. concrete, 1st class	12.00	13.00	10.00	9.50	11.00	15.00	12.00
279 cu yds. concrete, 2nd class	10.50	12.50	9.00	8.00	10.00	10.50	10.50
Chicken wire, per sq. ft.	.04	..	...	..	.04	.06	..
11,600 lbs. steel, I-beams and structural shapes in place	.06½	.07	.07	.05½	.08	.07½	.07
1,810 lbs. steel reinforcing bars in place	.04½	.07	.05	.06½	.06	.06	.10
Cast iron and spikes in place, per lb.	.05	.07	.06	.06½	.05	.06	.07
1,420 sq. ft. expanded metal in place	.05	.12	.03	.15	.20	.07½	.10
232 lin. ft. pipe rail in place, 1½-in. pipe	.40	.20	.25	.15	.20	1.00	.20
3 M. B. M. timber and plank in place, not inc. spikes or bolts	25.00	35.00	30.00	28.00	30.00	25.00	30.00
Cobble gutters, per sq. yd.	..	1.50	.75	.50	1.00	1.75	.80
Concrete gutters, per sq. yd.	..	1.50	1.00	.50	1.50	2.25	1.25
Porous tile drains in place, 4-in. diam., per lin. ft.	.10	.20	.20	.30	.25	.30	.15
Porous tile drains in place, 6-in. diam., per lin. ft.	..	.23	.25	.50	.35	.40	.25
Porous tile drains in place, 8-in. diam., per lin. ft.	..	.29	.30	.70	.60	.50	.30
Corrugated iron pipe in place, 8-in. diam., per lin. ft.	1.00	2.15	.90	.70	1.00	.50	.50
Corrugated iron pipe in place, 12-in. diam., per lin. ft.	1.25	2.15	1.50	.90	1.40	.70	.70
Corrugated iron pipe in place, 18-in. diam per lin. ft.	1.50	2.15	2.00	1.40	2.00	.90	1.00
Corrugated iron pipe in place, 24-in. diam., per lin. ft.	2.00	2.35	2.50	1.90	2.75	1.10	1.25
Corrugated iron pipe in palce, 30-in. diam., per lin. ft.	2.50	2.65	2.75	2.40	4.00	1.30	1.50
Corrugated iron pipe in place, 36-in. diam., per lin. ft.	3.00	3.75	3.50	2.90	7.00	1.50	1.75
Corrugated iron pipe in place, 42-in. diam., per lin. ft.	4.00	4.40	3.75	3.40	9.00	1.70	2.25
Corrugated iron pipe in place, 48-in. diam., per lin. ft.	5.90	5.50	4.00	3.90	11.00	1.90	2.50
Concrete iron pipe in place, 8-in. diam., per lin. ft.	.50	1.50	1.00	.70	1.00	1.00	1.25
266 lin. ft. concrete pipe in place, 12-in., diam.	.70	1.50	1.50	1.05	2.00	1.10	1.50
176 lin. ft. concrete pipe in place, 18-in. diam.	1.50	1.65	3.00	2.00	3.00	1.75	2.40
182 lin. ft. concrete pipe in place, 24-in. diam.	2.25	1.95	3.50	2.50	5.00	2.25	3.30
Concrete pipe in place, 30-in., diam., per lin. ft.	2.50	2.20	4.00	3.00	6.00	2.75	4.25
Concrete pipe in palce, 36-in. diam., per lin. ft.	2.75	3.25	4.50	3.50	10.00	3.25	5.30
Concrete pipe in place, 42-in. diam., per lin. ft.	3.50	3.95	5.00	4.00	11.00	3.75	6.25
Concrete pipe in place, 48-in. diam., per lin. ft.	4.00	4.50	6.00	4.50	12.00	4.25	7.50
8 lin. ft. vitrified tile pipe in place, 8-in., diam.	.50	.60	.25	.70	.60	.60	.50
Vitrified tile pipe in place, 12-in. diam., per lin. ft.	.80	1.30	1.00	.90	1.00	.80	.90
Vitrified tile pipe in place, 18-in. diam., per lin. ft.	1.50	1.75	1.75	1.80	3.00	1.00	1.75
Vitrified tile pipe in palce, 24-in. diam., per lin. ft.	2.00	2.15	2.00	2.50	4.00	1.20	3.00
1,300 lin. ft. side surfacing	.40	.31	.05	.12	.20	.25	.20
Force account:—							
Team and drive, per day	6.00	6.00	6.50	6.00	6.00	5.00	6.50
Foreman, per day	4.00	4.00	6.00	3.00	5.00	3.50	5.00
Labor, per day	2.50	2.50	3.00	2.50	3.00	2.50	3.00

at Mountain City. One of new roads to be built will be extension of crest of Blue Ridge highway from Boone, North Carolina, across Johnson County to Sullivan County line.

Granville, Tenn.—Jackson County has again voted in favor of issuance of bonds for good roads. Amount of bond issue is $100,000.

Jackson, Tenn.—The $2,000 balance remaining of good roads bond issue of 1909 has been appropriated between Ashport, Double Bridge and Denmark roads at meeting of Madison County Good Roads Commission.

Mountain City, Tenn.—Resolution has been adopted favoring bond issue of $150,000 for Johnson County to build pike roads.

Alpine, Tex.—Alpine citizens will on Dec. 20 determine issuance of good roads bonds in sum of $100,000. It is thought that issue will carry with very little opposition.

Commerce, Tex.—Commerce citizens have pledged their support for issuance of good road bonds in Hunt County. Number of farmers are also interested in project and effort will be made to get Hunt County Commissioners to call election some time in December to vote on issuance of $200,000 in road bonds.

Dallas, Tex.—Widening of Masten St. is being considered.

Dalhart, Tex.—Bids have been advertised for by City Council for concrete gutters on Denrock Ave. Practically all of main thoroughfares of city have been graded recently, and plan is on foot to extend grades into suburbs.

Dallas, Tex.—Three petitions for ordering of election for bond issue to pave Dallas-Oak Cliff viaduct are being circulated.

Dennison, Tex.—Ordinances creating sidewalk improvement districts on both sides of Austin Ave., from Woodard to Walker Sts., and on both sides of Burnett Ave., from Woodard to Bond Sts., have been read and finally adopted.

Eagle Pass, Tex.—Bonds in sum of $60,000 for street and park improvements will be voted on Dec. 16.

Fairfield, Tex.—Election will be held Dec. 16 for voting on $50,000 good roads bond issue.

Ft. Worth, Tex.—Paving of number of streets is being planned.

Galveston, Tex.—Citizens have voted in favor of $150,000 bond issue for paving, draining and otherwise improving streets and $25,000 for streets in section of West End.

Galveston, Tex.—Citizens of Arcadia and vicinity have presented petition to Board of County Commissioners stating their desires with reference to road betterments under $250,000 bond issue.

Mineral Wells, Tex.—Street paving bonds for $75,000 have been carried by vote of 280 to 36 in special election.

Sulphur Springs, Tex.—Petition, signed by several hundred citizens, has been presented to City Commission, asking that election be called for purpose of voting bond issue for paving public square.

Yoakum, Tex.—Election is being considered for voting on $100,000 bond issue for street improvements.

Ogden, Utah.—In effort to secure paving of 25th St., from Washington Ave. to Union Depot, John Spargo and other property owners will circulate petition during next few days.

Ellensburg, Wash.—Kittitas County Commissioners have appropriated $2,500 for improvement of highway between this city and North Yakima. This, with $10,000 appropriated by Yakima Board, will be used on same road. Aim is to straighten short curves and cut down number of grades between two cities and to make good road for automobile traffic.

Seattle, Wash.—Resolutions have been adopted for improvement of various streets.

Superior, Wis.—Tower Ave., from 16th St. to 28th St., is to be paved, and there is reason to believe that asphalt will be favored for job. Ogden Ave., from Third to Belknap, may also be paved with asphalt. Cummings Ave., Iowa Ave., and several other streets are also to be improved.

Washburn, Wis.—A direct highway system extending from eastern to western line of Bayfield County, connecting with highway to be built by Douglas County, giving direct route from seat of Bayfield County to Superior, is contemplated by County Board of Bayfield. According to engineers who have made preliminary survey, it will cost in neighborhood of $75,000.

CONTRACTS AWARDED.

Tuscon, Ariz.—Contract for construction of Tucson-Bisbee Highway by Board of Supervisors, to Johnson & Roberts, Tucson, at $14,578. Other bids received were D. O. Johnson, $19,750; Griffin & Pacheco, $19,412.

Azusa, Cal.—For constructing 42,300 sq. ft. walks and 8,375 lin. ft. curbs on Alameda Ave. to Wardall & Wagoner, of Monrovia at 8⅞ cts. per sq. ft. for walks and 23 cts. per lin. ft. for curbs.

Oakland, Cal.—Upon recommendation of Commissioner of Streets Baccus, City Council has awarded following contracts: C. W. Cross, grading, curbing, guttering and oil-macadamizing Pleitner Ave., from Nicol Ave. to School St.; Oakland Paving Co., similar improvement of 61st Ave., from East 14th St. to Noble St.: Hutchinson Co., for similar improvement of 62d St., from East 14th St. to Foothill Park; Ernest H. Sundberg, for similar improvement of Garden St. and East 28th St., from East 27th St. to 25th Ave.

San Diego, Cal.—For paving as follows: Asphalt pavement on I St., to Barber Asphalt Paving Co., of Los Angeles, at 16.7 cts. per sq. ft.; asphalt pavements on Second St., to Fairchild-Gilmore-Welton Co., of Los Angeles, at $19,355, and for paving, constructing sidewalks and gutters on El Cajon Boule, to C. L. Hyde Constr. Co., at $51,939.

Santa Ana, Cal.—For improving 9½ miles of Anaheim-Olive Rd., to Withers & Crites, Wilcox Bldg., Los Angeles, at $37,653. Other bids follow: George S. Benson & Sons, $42,271; the Rogers Bros. Co., $44,729. Daniel S. Halladay is Ch. Engr.

Elkton, Del.—At special meeting of County Commissioners contract for building stone road from St. Augustine to Delaware State line, was awarded to Juniata Co., at bid of $25,305.

Moline, Ill.—To McCarthy Improvement Co., Davenport, Ia., for paving with asphalt 10th Ave., from 21st to 23d Sts., and of 11th Ave., from 11th to 12th Sts.

Normal, Ill.—To Roy L. Williams, at $18,213, for Linden St. and Vernon Ave. pavement.

Hartford City, Ind.—B-- Commissioners of Blackford Co., to Albert C. Brad, for construction of road, at $9,634.

Wabash, Ind.—To A. H. Barnes & Co., Logansport, Ind., at $12,913, for constructing Moyer Rd.

Leavenworth, Kan.—For regrading of Elmgrove Rd. to Archie Turner at $2,200.

Jersey City, N. J.—Contract for repaving of Grand St., from Washington to Hudson St., with granite blocks, went to Ralph Sangulario, the lowest bidder, and for repaving of Montgomery St., from Cornelison Ave. to Foye Pl., to William Van Keuren.

Buffalo, N. Y.—For repaving with asphalt East Ferry St., to German Rock Asphalt Co., at $74,630.

Shelby, N. C.—To J. T. Platt of Statesville, contract from No. 6 Twp. Rd. Comrs., to construct boulevard from Shelby to Cleveland Springs. This is first work No. 6 Twp. has let by contract out of its $100,000 bond issue and if contract work proves successful, Cleveland Springs Rd. will be extended by contract labor to Buffalo, about six miles east of Shelby, where township line terminates.

Dresden, O.—To George H. Heffner & Son, Celina, O., at about $30,000, for paving of Main St., from canal bank to corporation line, consisting of concrete base. Townsend paving blocks, etc.

Gallipolis, O.—To James L. Betz, of Gallipolis, and Thomas Jones, of Patriot, for paving of 2d Ave., from Court St. to Vine St., and Vine to 3d Ave., with vitrified brick, at $1.26 per sq. yd.

Toledo, O.—For furnishing portable asphalt repair plant by Bd. Control to T. L. Smith Co., of Coshocton, at $1,800.

Tulsa, Okla.—Only one bid was received for paving of 5 blocks of city streets and two alleys from F. P. McCormick Co., as follows: $1.68 for asphalt and $1.85 for brick.

Medford, Ore.—For grading Pacific highway over Siskiyou Mountains, to Kessel & McDowell Logging Co., Tacoma, Wash., at $107,534.

Maryville, Tenn.—The Blount County Pike Commission have let contract to R. B. Oliver for grading and macadamizing Code's Cove road. This road runs from Maryville to Code's Cove.

Dallas, Tex.—By Board of Municipal Comrs., contracts to Texas Bitulithic Co. for laying of creosoted wood block pavin~ on Tenth, Wood and Young Sts., for approximately $79,000 worth of work.

Dallas, Tex.—Contract and bond of W. P. Banks & Sons have been approved for paving of concrete curbs and gutters in Parkland Hospital grounds.

Fort Worth, Tex.—To G. T. Young, contract for building one mile of road leading out of Arlington toward Mansfield at $1,550.40. Three other bids were submitted as follows: J. A. Hamaker $1,535; W. F. Elliott, $1,631.60; G. B. Coke, $1,550.40. This contract was let pursuant to rule of Commissioners to accept bids on one mile of roadway, so as to allow small local contractors opportunity to make bids.

San Antonio, Tex.—By City Council, recommended by paving expert, Mr. C. D. Pollock to Rushmore & Goudy, of Kansas City, Mo., to pave East Commerce St., 32,000 sq. yds., with vertical fiber vitrified brick on 5-inch concrete base at $2.51 per sq. yd. This is first contract awarded of $4,000,000 paving fund available by city at this time. Fred Fries is City Clk.

Olympia, Wash.—For construction of Sunset Highway, Reardan to Davenport, to (a) Henry Styles, Tacoma, at total bid of $39,250. Other bidders were: (b) Clifton Applegate Co., Spokane, $44,779.94; (c) Caughren Woldson, Spokane, $44,593.54; (d) Wm. McKivor, North Yakima, $51,150. For Sunset Highway, Davenport west to same bidder (a) at 18,700. Other bids as follows: (b) $19,770.11, (c) $20,004.93, (d) $29,600. For Pacific Highway, Blair to Custer, contract was awarded to L. H. Goerig, Seattle, at $36,968.77. Other bidders were: C. E. Lind, Bellingham, Wash., and K. Sauset, Bellingham.

Seattle, Wash.—For grading of 39th Ave. Southwest, lowest bidder was S. Normile at $46,354.75. Other bidders were as follows: W. F. Manney & Co, $51,231.30; Andrew Peterson, $59,032.75; L. C. Lane, $51,166.30; Hans Pederson, $54,432.25; Henry Brice, $55,829.30; F. A. Hadley, $53,472.70; P. J. McHugh, $48,254.05. S. Normile was lowest for grading Ellis Ave., at $28,046.75.

SEWERAGE

Clifton, Ariz.—Town Council is said to have decided to construct sewers in Chase Creek District.

Ocean Beach, Cal.—F. M. Lockwood has completed plans for a sewer system to be constructed at cost of $50,000.

Stockton, Cal.—Resolutions have geen adopted for construction of vitrified clay pipe, 6-in. interior diameter, for about 384 ft. L. F. Kuhn is City Clerk.

Stockton, Cal.—Resolutions have been adopted for construction of sewers on Van Buren St. and Harrison St. L. F. Kuhn is City Clerk.

Dayton, Fla.—Under direction of ordinance committee of Daytona City Council, final draft of ordinance proposing bond issue of $175,000 has been prepared. Proposed issue is for installation of sewerage and drainage system for city.

Punta Gorda, Fla.—Citizens have voted $60,000 in bonds for municipal improvements, including sanitary and storm sewers, water works, and extension of electric light system.

Bloomington, Ill.—Petitions have been received for sewer on Market St., between White Oak Rd. and Hinshaw Ave., north to Mulberry. It is proposed to lay this sewer on two streets with common outlet.

Bloomington, Ill.—One bid was received for construction of proposed sewer on Roosevelt Ave. and Kelsey St. I. A. Lederer submitted figures of $1,218.45. Engineer's estimate amounted to $1,073.75. As consequence board will readvertise for bids on this improvement.

Joliet, Ill.—City will shortly ask for bids for construction of Second Ward sewer system. Cost $25,000. C. D. O'Callahan is City Engr.

Peoria, Ill.—Local Impt. Bd. has adopted resolution instructing City Engr. L. N. Jeffries to draw plans and furnish estimate for extension of sewer on Bridge St. to river line.

Springfield, Ill.—Engineers for city and Park Board will figure together upon cost of constructing five-foot brick sewer around lake at Bunn Park, formerly Mildred Park, to stop flow of sewage from southeast Springfield through bathing pool.

Fort Wayne, Ind.—Resolution has been adopted for construction of local sewer in and along Dalman St. H. W. Becker is Clk.

Fort Wayne, Ind.—Bd. of Wks. will inform committee from the Lakeside Civic Impt. Assn. that resolutions for two sewers necessary for establishment of a pumping station in Lakeside for relieving main sewers from flood waters will be up for confirmation and that Bd. will immediately order bids for pumping machinery.

Plaquemine, La.—City is advocating building of a new water works and sewerage plant, and has taken subject up with consulting engineer from Shreveport.

Baltimore, Md.—Plans for $300,000 worth of sewerage work to be put under contract this year will be submitted to Sewerage Commission by Sewerage Engineer Hendrick for approval. Work to be done under these contracts will be confined chiefly to extension of present sewers to outfall system.

Hyattsville, Md.—The Prince Georges and Montgomery County Sewerage Commission, members of which Gov. Goldsborough appointed to make investigation of drainage and sewerage conditions surrounding District of Columbia, is busily engaged in preparing its report.

St. Paul, Minn.—Preliminary plans have been completed for construction of sewer where it is needed on Marshall Ave.

Hammonton, N. J.—At request of Sewerage Commissioners, the Hammonton Council has authorized additional loan of $30,000, making total of $100,000 authorized to date for construction of sewer system.

Passaic, N. J.—Resolution to be introduced by Commissioner Reid directs City Clerk to advertise for proposals to construct sewer in Summer St., as provided in ordinance which has been adopted.

Perth Amboy, N. J.—Ordinance has been adopted for laying of 12-in. pipe sewer in Miller St., from William St. to Pearl Pl., also ordinance for 15-in. pipe sewer in Broad St., from Division St. to East Ave. W. La Roe is City Clerk.

Pitman, N. J.—Installation of sewage disposal plant is being planned.

Rahway, N. J.—State Board of Health will give its approval of plans by Engineer Clyde Potts for sewage disposal plant as soon as site for same has been selected.

Brooklyn, N. Y.—Tentative plans have been drawn for big interborough sewer through that portion of Brooklyn and Queens bordering on Jamaica Bay improvement, which would be largest sanitary sewer in world. Plans have been drawn for long intercepting sewer to extend from 26th Ward sewage disposal plant, in Paedergat section, twelve miles east to Burroughs' farm southeast of Jamaica. It would take care of all sewage from Richmond Hill and neighboring points which lie upon backbone of Long Island. Estimated cost, $2,000,000.

Port Chester, N. Y.—Board of Trustees and Citizens' Sewer Committee has decided to receive four separate bids for construction of sewer system and disposal works, which is to be begun in near future, rather than be content with lump bid.

Waterloo, N. Y.—At meeting of Village Trustees, Engineer Bowman presented his report on advisability of constructing two separate disposal plants, instead of one originally specified in contract. Proposition has been reviewed and approved by State Department of Health. Board has instructed Mr. Bowman to draw up plans for two Ernhoff disposal tanks and submit them before Board, as soon as completed. This will necessitate calling of special meeting to consider matter of advertising for bids.

Springfield, O.—Councilman James A. Hynes, of Second Ward, is endeavoring to have contract for Pearl St. and Tibbetts Ave. sewer system awarded before first of coming year, in order to insure construction of sewer as nearly as possible.

Erie, Pa.—Resolution has been adopted that city engineer be instructed to prepare data for 9-in. sanitary sewer in Elliott Ave., from Peach St. south 230 ft.

Providence, R. I.—Resolution has been passed directing City Solicitor to apply for legislation authorizing city to hire $500,000 for construction of sewers.

Dallas, Tex.—On recommendation of Commissioner Nelms, City Engineer was instructed to have 6-in. sanitary sewer installed in Wood St., from Houston St. to Southern Traction Co. Building at corner of Wood and Jefferson Sts.

Dallas, Tex.—Plans for proposed Dallas sewage disposal plant will be presented to Board of Municipal Commissioners by J. H. Fuertes of New York, engineer who designed filtration plant. Although plans will be given to Board, they are yet subject to change. The $550,000 bond issue authorized for this work has not yet been placed upon the market and will not be until some time in January. Bids must be advertised for after plans are approved and adopted, bonds must be sold, and, all in all, officials doubt that they will be in readiness to consider actual construction work before February. Site for sewage disposal plant, about three miles from the city on the west bank of the Trinity, has already been selected. All rights of way for trunk line, however, have not yet been secured.

Galveston, Tex.—Citizens have voted in favor of $150,000 bond issue for extending sewer system.

Seattle, Wash.—City Engr. A. H. Dimock has completed plans and specifications for construction of sewers on Swift Ave., at cost of about $18,000.

CONTRACTS AWARDED.

Oakland, Cal.—Philip Schuyler has been awarded contract for construction of storm sewer in 26th St. and Telegraph Ave., from Broadway to 27th St.

Normal, Ill.—To John Bretz, Springfield, Ill., at $4,108, for installation of sewer on Linden St., on Hovey Ave., Vernon Ave., Taylor and Oak Sts.

Lehigh, Ia.—To Benson & Reed, Fort Dodge Ia., at $4,012, for 3,677 lin. ft. of sanitary sewer by Council. Construction.

Hamburg, Ia.—To Frank Zutz, construction of sewer extension on Washington, Park, Main and Argyle Sts.

Baltimore, Md.—McCarthy & O'Herron are apparently lowest bidders for two sewerage contracts opened by Board of Awards. Bids were referred to Sewerage Commission for tabulation. For both of sewerage contracts there were five bidders. For first the following submitted bids: McCarthy & O'Herron, Carozza, Levezza & Carozza, Whiting-Turner Construction Co., Gallagher, Boyle & Bryan and James Ferry & Sons. For other sewerage contract, following were bidders: Ryan & Reilly, James Ferry & Sons, Carozza, Levezza & Carozza, Whiting-Turner Construction Co. and McCarthy & O'Herron.

Boston, Mass.—For constructing sewerage works for Mattapan, Brook and Delhi Sts., Dorchester, to Chas. Latorella, of Roslindale, Boston, at $15,135. Other bidders: Bevilacqua Constr. Co., $16,179; Wm. L. Dolan, $16,463; Geo. J. Regan, $16,553; M. De Sisto & Co., $16,966; Wm. J. Barry, $17,610; West Roxbury Trap Rock Co., $17,611; Chas. E. Gow Co., $17,684; Peter W. Hill, $18,446; McCarthy & Welch, $18,594; Anthony Baruffaldi, $19,217; Kelley & Sullivan, $20,635; W. B. Bryne, $23,133; John McCourt & Co., $23,703; M. Russo & Son, $25,641.

Detroit, Mich.—To Jas. P. Rusche, of Grand Rapids, for construction of sewer in Hamilton Ave., at $28,300.

Flint, Mich.—By Council, for construction of sewer, etc., on Grand Traverse St., to A. H. Prange at following bid: 14 cts. per foot for 12-in. sewer; 17 cts. per foot for 15-in. sewer; 20 cts. per foot for 18-in. sewer; 24 cts. per foot for 20-in. sewer; 30 cts. per foot for 24-in. sewer; $1.50 for 27-in. sewer; 60 cts. per cu. yd. for trenching; $40 each for manholes; $40 each for catch basins; $40 for 27-in. standard outlet and $2 per sq. yd. for relaying brick pavement, or approximate sum of $6,837.36, for same complete.

Stillwater, Minn.—For construction of 2,830 ft. 6, 12 and 15-in. pipe sewers on S. 1st St., to McGee & Nolan, Stillwater, $8,658. Other bids as follows: Pastoret Constr. Co., Duluth, $9,289; Kircher Bros., St. Paul, $9,864; Fraser & Danforth, St. Paul, $9,260.

Springfield, Mo.—To F. W. Johnson, city, at about $11,000, for constructing two miles of 8 and 10-in. vitrified clay pipe sewer with necessary manholes, flush tanks, lamp holes, etc., in Dist. No. 4 of Sect. No. 8.

Jersey City, N. J.—Contract for Pine St. sewer has been awarded to Waddington & Sons at 97 per cent. of standard price.

Binghamton, N. Y.—Board of Contract and Supply awarded contracts for construction of five sewers as follows: Robert St. sewer, Scanlon & Gorman, $232; Moore Ave., George Pignatello, $360.95; Broome St., George Serifina, $1,125.15; Wheeler Ave., George Pignatello, $420; Maple Ave., George Pignatello, $328. Work on these improvements will begin at once.

Sioux Falls, S. D.—For construction of sewer connections on Phillips Ave. to Ferris & Sons.

Dallas, Tex.—Contracts and bonds of Winslett-Eldridge Co. have been approved for laying of sanitary sewers in Addison St., Oak Cliff, crossing Marsalis, and on Wood and Young, between Harwood and Akard Sts.

Houston, Tex.—To Hardman & Nelson, at $18,524, for construction of Preston Ave. storm sewer.

WATER SUPPLY

Grass Valley, Cal.—New pipe line has been ordered laid in Alta St.

Hartford, Conn.—John P. Freeman, of Providence, R. I., has been engaged as consulting engineer, with F. B. Stearns, of Boston, relative to construction of Nepaug water system.

Wilmington, Del.—Water Bd. Directors have sent letter to Council informing them that they are making all necessary preparations as speedily as possible for installation of water meters in every water service through city, and requesting to know how soon appropriation for work would be ready.

Wilmington, Del.—Finance Committee has been authorized to prepare ordinance providing for bond issue not to exceed $50,000, money to be turned over to Water Board to help pay cost of installing meters in every property in city.

Macon, Ga.—Fire protection through laying of water mains is to be afforded residents of Cherokee Heights. Superintendent H. D. Langworthy has been requested to prepare estimate at once of approximate cost of laying mains and installing fire hydrants.

Plaquemine, La.—City is advocating building of new water works and sewerage plant, and has taken subject up with consulting engineer from Shreveport.

Boston, Mass.—Council has passed second time loan order for $150,000 additional for high pressure water service.

Pittsfield, Mass.—Board of Public Works has voted to lower 10-inch water pipe line from Florence Learned Pl. to Salisbury estate, which is part of line on way to city farm. Board will also start on continuation of this line to city and entire work planned will cost about $12,000. Approximately 8,300 feet of pipe will be required.

Grand Rapids, Mich.—At special meeting of Board of Works, resolution presented by Commissioner Burch authorizing General Manager Cutcheon to advertise for purchase of vertical triple expansion pump, similar to type of Allis-Chalmers pump now in use, was passed unanimously.

Vicksburg, Mich.—Municipal water works plant will be constructed.

Jersey City, N. J.—Members of engineering staff of Jersey City, by order of Commissioner James Ferris, are now plumbing and measuring Split Rock Pond, six miles outside of Boonton, with view to obtaining new permanent source of water supply for Jersey City.

Binghamton, N. Y.—Water works bonds have been awarded to Spitzer-Roeick of New York City.

Binghamton, N. Y.—Water conditions are being discussed. Engineer Nicholas S. Hill, Jr., recommends high pressure system.

Kingston, N. Y.—Comrs. have been directed to make improvements at once to waterworks in accordance with engineers' recommendations.

Lyons, N. Y.—General sentiment of taxpayers of this village seems to favor installation of brand new water works system with its supply from Junius ponds at cost of $142,000.

Lyons, N. Y.—Special election has been held to vote on four water propositions submitted to taxpayers by Village Board and Advisory Board. First proposition provided for purchase of system of the Lyons Water Works Co. at expense of $50,000; second, installation of new system using river supply, at cost of $102,000; third, purchase of system and install extensions thereto, taking supply from Junius ponds, at cost of not exceeding $95,000, and fourth to install entirely new system, taking water from Junius ponds, at cost not exceeding $142,000. Purpose of election was to advise Board which proposition was preferred by majority of taxpayers. Last question was carried.

High Point, N. C.—City has invited bids for constructing new 3,000,000-gallon concrete-lined clear-water basin. Bids include labor, material and various appliances.

Greenville, S. C.—Purchase of water works plant of Paris Mountain Water Company by city is under consideration.

Orangeburg, S. C.—Council will sell bonds in sum of $60,000 for water and light purposes early part of January.

Akron, O.—Bids will be received at office of auditor of the City of Akron, State of Ohio, until 12 o'clock noon, of January 7, 1914, for purchase of bonds of said city, in aggregate sum of $1,250,000 is-

sued for purpose of extending, enlarging, improving, repairing and securing more complete enjoyment of the water works system. James McCausland is City Auditor.

Youngstown, O.—Bonds in sum of $250,000 will be issued to provide funds for completing Milton reservoir project.

Jackson, Tenn.—Bond item of $35,000 for waterworks improvements will be voted on Jan. 19, 1914.

Dallas, Tex.—Plans have been completed for filtration plant.

Fort Worth, Tex.—Voters of Fort Worth will be called on to vote on issue of $100,000 waterworks refunding bonds and issue of $50,000 for repairs, improvements and extensions for Water Dept.

Galveston, Tex.—Citizens have voted in favor of $20,000 bond issue for increasing city's water supply.

Seattle, Wash.—Resolution has been adopted for construction of water mains in 30th Ave. South.

CONTRACTS AWARDED.

Riverside, Cal.—Following are contracts awarded for water works construction: Contract 1 for furnishing and laying pipe to Lacy Mfg. Co., of Los Angeles, at following bid: 17,450 ft. 30-in. G. No. 12 r.-s. pipe, $1.80; 200 ft. 30-in. G. No. 10 r.-s. pipe, $9.67; 21,325 ft. 20-in. G. No. 12 r.-s. pipe, $1.31; 1,300 ft. 20-in. G. No. 10 r.-s. pipe, $1 51; 18,125 ft. 16-in. G. No. 12 r.-s. pipe, $1.085; 2,225 ft. 14-in. G. No. 12 r.-s. pipe, 98 cts.; 100 ft. 12-in. G. No. 12 r.-s. pipe, 90 cts.; 42,950 ft. 10-in. G. No. 12 r.-s. pipe, 74.5 cts.; 48,200 ft. 8-in. G. No. 14 r.-s. pipe, 4.75 cts; 9,225 ft. 8-in. G. No. 12 r.-s. pipe, 56.5 cts.; 62 000 ft. 6-in G. No. 14 r.-s. pipe, 37 cts.; 99,800 ft. 4-in. G. No. 16 r.-s. pipe, 22.5 cts ; 6.500 ft. 2-in. dipped pipe, 15 cts.; 100 ft. 1½-in. dipped pipe, 13 cts.; 100 ft. 1-in. dipped pipe, 12 cts.; 100 ft. ¾-in. dipped pipe, 10 cts.; 1 30-in. gate valve installation, $32; 5 20-in. gate valve installation, $22 each; 4 16-in. gate valve installation, $17 each; 1 14-in. gate valve installation, $16; 4 12-in. gate valve installation, $11 each; 16 10-in. gate valve installation, $9 each; 28 8-in. gate valve installation, $6 each; 69 6-in. gate valve installation $3.50 each; 65 4-in. gate valve installation, $3 each; 10 2-in. and smaller, 60 cts. each; 36 air valve installation, $2.25 each; 379 fire hydrants, $4.25 each; 30,000 4-in. non-corr. covering, 03.5 cts.; 20.000 6-in. non-corr. covering, 5 cts.; 10.000 8-in. non-corr. covering, 6 cts.; 15.000 10-in. non-corr. covering, 8 cts.; 2.225 14-in. non-corr. covering, 12 cts.; 4.000 16-in. non-corr. covering, 13 cts.; 5.000 20-in. non-corr. covering, 16 cts.; 6.000 30-in. non-corr. covering, 24 cts.; total bid, $193,587; eliminating 4-in., 6-in., 8-in., 10-in. and 30-in. and their appurtenances and adding non-corros. covering on all other pipe. Other bidders were: Baker Iron Works, Los Angeles, $218,880, and T. J. Shea, Los Angeles, $199 901,85. Contract No. 2 for furnishing and laying pipe to Arthur S. Bent Co., Los Angeles, at total bid of $44,000. Itemized bid as follows: 17,450 ft. 30-in. reinforced concrete pipe at $2.05; 2,040 ft. 24-in. reinforced concrete pipe, $1.40; 290 ft. 22-in. reinforced concrete pipe, $1.20; 500 ft. 20-in. reinforced concrete pipe, $1.05; 410 ft. 18-in. reinforced concrete pipe, 95 cts.; 520 ft. 16-in. reinforced concrete pipe, 90 cts.; 900 ft. 14-in. reinforced concrete pipe, 75 cts.; 180 ft. 12-in. reinforced concrete pipe, 73 cts.; 50 ft. 10-in. reinforced concrete pipe. 67 cts; concrete in bulkheads, $8. Contract No. 3, for trenching, headworks, laying pipe, etc., awarded to Johnson Shea Co., Riverside, at total bid of $44,553. Totals of other bidders: Chambers & Heafery, Oakland, $57,658; J. T. Shea, Los Angeles, $39.715.35, and Plummer-Adams, Springfield, Mo., $66,700. Itemized bid of successful bidder as follows: 17,450 ft. trench excav. for 30-in. pipe at 20 cts.; 2,040 ft. trench excav. for 24-in. pipe, 15 cts.; 290 ft. trench excav. for 22-in. pipe, 15 cts.; 23,125 ft. trench excav. for 20-in. pipe, 12 cts.; 410 ft. trench excav. for 18-in. pipe, 15 cts.; 18,-645 ft. trench excav. for 16-in. pipe, 10 cts.; 3.125 ft. trench excav. for 14-in. pipe, 10 cts.; 1,280 ft. trench excav. for 12-in. pipe, 10 cts.; 43,450 ft. trench excav. for 10-in. pipe, 10 cts.; 57,925 ft. trench excav. for 8-in. pipe. 10 cts.; 62,-000 ft. trench excav. for 6-in. pipe, 10 cts.; 99,800 ft. trench excav. for 4-in. pipe, 8 cts.; 6,800 ft. trench excav. for 2-in. and smaller, 8 cts.; 3,600 cu. yds. extra depth trench excav., 30 cts.; 600 cu. yds. loose rock excav. in trenches, $1; 100 cu. yds. solid rock excav. in trenches, $3; 130 sq. yds. pavement excav. concrete base, 40 cts.; 5,320 sq. yds. crushed rock macadam excav. over trench, 20 cts.; 6 well houses, complete, $80 each; 15 cu. yds. miscellaneous concrete, $13.50; 2,040 ft. 24-in. vitr. sewer pipe, $2; 290 ft. 22-in. vitr. sewer pipe, $1.50; 500 ft. 20-in. vitr. sewer pipe, $1.40; 410 ft. 18-in. vitr. sewer pipe, $1.10; 520 ft. 16-in. vitr. sewer pipe, 90 cts.; 900 ft. 14-in. vitr. sewer pipe, 80 cts.; 1,180 ft. 12-in. vitr. sewer pipe, 55 cts.; 500 ft. 10-in. vitr. sewer pipe, 45 cts.; 500 ft. 8-in. vitr. sewer pipe, 40 cts.; 8-in. c.-i. pipe, laid, 24 cts.; 6-in. c.-i. pipe, laid, 19 cts.; 4-in. c.-i. pipe, laid, 15 cts.; 8-in. gate valves, installed, $3; 6-in. gate valve, installed, $2.50; 4-in. gate valves, installed, $2.50; fire hydrants, installed, $7.50. Contract No. 4 for reservoirs and station buildings to Arthur S. Bent Constn. Co., Los Angeles, at total of $40,500. Totals of other bidders: Paul H. Ehlers, Los Angeles, $46,000; F. K. Benchley, Fullerton, $45,229; Fred Peter, Riverside, $49,-200; Earl F. Low Co., Los Angeles, $38,-975 (city to pump water); Putnam Stone Con. Co., Pasadena, $41,618, and Cresmer Mfg. Co., Riverside, $47,997. Itemized successful bid as follows: 10,725 cu. yds. earth excavation at 25 cts.; 5,700 cu. yds. loose rock excav., 50 cts.; 500 cu. yds. solid rock excav., $1; 3,950 cu. yds. embankment, 10 cts.; 44 cu. yds. class A concrete, $9; 1,260 cu. yds. class B concrete, $9; 61 cu. yds. class C concrete, $8; 9.300 lbs. reinforcing bars, 5 cts: 38,750 lbs. reinforcing mesh, 5 cts.; 12¼ ins. c.-i. pipe, B. & S., $50; 13,700 lbs. c. i. specials and flat c.-i. pipe, 50 cts. Contract No. 5 for pumps and connections, all bids were rejected. Bidders were: Byron Jackson Iron Works, Los Angeles, $12,-652; Terry Engine Works, Los Angeles, $8,075; Davis Rogers, San Francisco, $8,-298 for Platt pumps, and Davis Rogers, $8,865 for Buffalo pumps. Contract No. 6 for hydrants and valves to Columbian Iron Works, Chattanooga, Tenn., at total of $13,989. Totals of other bids as follows: Marry Lally Co., San Francisco, $14,595.25; Chapman Valve Mfg. Co., Indian Orchard, Mass., $13,589.18; Darling Pump & Mfg Co., Williamsport, Pa., $13,-264.25; Waterworks Supply Co., Los Angeles, $15.126.96; Keystone Iron Works, Los Angeles, $19.700; Iowa Valve Co., Los Angeles, $13.712.06; Ludlow Valve Mfg. Co., Troy, N. Y., $15.201, and M. Greenberg's Sons, San Francisco, $12,-090.50. Successful bid is itemized as follows: 1 30-in. gate valve, single gate. 80 ft., at $256; 1 24-in. gate valve, single gate. 80 ft., $145.45; 6 20-in. gate valves, $107.50; 4 16-in. gate valves. $69.30; 1 14-in. gate valve. $50.60; 5 12-in. gate valves, $39.85; 16 10-in. gate valves, $27.70; 28 8-in. gate valve, $18.20; 69 6-in. gate valves. $12.10; 67 4-in. gate valves, $8.15; 121 4-in. fire hydrants, $20 80 (340 with 2½ x 4, $21.30); 191 6-in. fire hydrants, $21.50 (with 2½ x 4-in., $22); 39 4-in. steamer fire hydrants, $22.80; 28 6-in. steamer fire hydrants, $23.50; 1 30-in. sluice gate, $103.80; 1 20-in. sluice gate, $61.65; 1 10-in. sluice gate, $20.65; 8 8-in. sluice gates, $17.70; 2 4-in. air valves, $53.65 (Christman); 34 2-in. air valves, $21.50 (Christman); 1 16-in. float valves. $349 75 (Davis); 2 8-in. float valves, $141.75 (Davis); 1 16-in. wheel gate valve flanger, $61 80; 2 12-in. wheel gate valve flanged, $32.60 2 8-in. wheel gate valve flanged, $15.20; 2 6-in. wheel gate valve flanged, $9.85; 1 4-in. wheel gate valve flanged $5.60; 1 12-in. hor. sw. check valve. $39.75; 2 6-in. hor. sw. check valves, $12.95. Contract No. 7 for pipe contract to U. S. Water & Steam Supply Co., Kansas City, Mo., at following bid: 4-in. c.-i. pipe at $0.179 and $0.035; 6-in. c.-i. pipe, $0.284 and $0.044; 8-in. c.-i. pipe and larger, 40 cts. and 04.9 cts.; B. & S. castings f. o. b. Riverside. Burns & McDonnell, of Kansas City, Mo., are consulting engineers. Total amount of engineer's preliminary estimate was $312,-314.60; total contracts as per final plans, $307,903.56.

Lynn, Mass.—To Connelly and Crowley, a firm comprising Joseph Connelly of Norwood, Mass., and Engineer D. Frank Crowley of Bristol, Conn., were lowest bidders for contract of building a dam for Lynn Water Department, at $195,000.

Hopkins, Mo.—For water work department to Bash & Gray for laying 600 ft. of 8-in. pipe at 26 cts. per ft.; 4,190 ft. of 6-in. at 25 cts., and 1,740 ft. of 4-in. at 20 cts. per ft. For standpipe to Chicago Bridge & Iron Works at $3,450, and for Triplex pump with oil engine to Platt Iron Works Co., Dayton, O., at $10,200; with building, etc., $1,500 extra; total, $11,700. Henrici, Kent & Lowry Engineering Co.

Jersey City, N. J.—To Fagan Iron Works, contract for special castings for supplying water gates and manhole heads.

Raleigh, N. C.—Contract for concrete foundation for big new pump at water station has been awarded to J. G. Council & Co., at cost of about $2,000. There will be about 300 cu. yds. of construction.

Hamilton, O.—To George Georgeson, at $1,198, for construction of booster station, and Cullen & Vaughn, at $2,250, for repair of water works receiving well.

Aberdeen, S. D.—To Yeoman Bros. of Chicago, Ill., at $1,800, for furnishing of two 10-in. Lawrence vertical shaft centrifugal pumps, capacity each of 2,900 gals. per min.

Sioux Falls, S. D.—For construction of all water connections on Phillips Ave., to Ferris & Son.

Fort Worth, Tex.—To Smith & Whitney, Dallas, at $920, lowest bidder for furnishing new boiler feed pump for water plant at Powell field.

Willis, Tex.—To Des Moines Bridge & Iron Works Co., for 50,000-gallon steel tank, to be erected on 108-ft. tower.

Norfolk, Va.—Board of Control has awarded to Whit P. Tunstall contract for replacing parts of water mains in Commercial Place and Division St., at $968.

Aberdeen, Wash.—To Crane Co., 419 2d Ave. S., Seattle, at $995, on furnishing 5,000 ft. of 2-in. 5,000 ft. of 1-in. and 5,000 ft. of ¾-in. wrought iron pipe, tar dipped inside and out.

Seattle, Wash.—To Washington Construction Co., Northern Bank Building, at $55,992, for installation of shafts for tunnel, Lake Union.

Seattle, Wash.—For laying water mains on Surbur Ave., lowest bidder was V. Ramaglia at $6,650.50.

LIGHTING AND POWER

Gadsden, Ala.—City administration is engaged in working out plan whereby municipally owned electric light and power plant may be operated in Gadsden.

Fort Smith, Ark.—City Commissioners are laying their plans for extension of ownership of public utilities, and if present plans mature city will be manufacturing its own current for street lighting in a few years.

Los Angeles, Cal.—City Council has directed city engineer to prepare plans for ornamental lighting system on Wilshire Boulevard, from Parkview to west city limits.

Ontario, Cal.—Specifications have been made for installation of ornamental electroliers on east drive of Euclid Ave., between State and C Sts., on A St., between Euclid and Lemon Aves., on Transit and Depot Sts., between Euclid and Lemon, and on Lemon between State and A Sts.

San Francisco, Cal.—The West End Betterment Club, believing that to make lighting system of district complete, cluster lights should be installed along Baker St. to Fulton and along Fulton to Divisadero St., has instructed club's lighting committee to petition Supervisors to have such lights installed on these thoroughfares.

Sutter, Cal.—Supervisors of Sacramento County will call election for January 6 next in Sutter Township to vote on establishment of lighting district.

Southport, Conn.—Through efforts of Village Improvement Society, Harbor Rd., Willow St., Spruce St., Nic St. and Rose Hill will be lighted by electric lights.

Wilmington, Del.—Survey is being made for installation of municipal lighting plant. J. S. McCrary Co., engineers.

St. Petersburg Fla.—As soon as it is possible to do so, City Comrs. will begin construction on municipal gas plant, voters having decided by vote that they wish such a utility.

Delevan, Ill.—Installation of cluster lights on Locust St. is being discussed.

Knoxville, Ill.—At special meeting of City Council of Knoxville a street lighting contract embodying provisions discussed at recent mass meeting was authorized and will be presented to McKinley Company for signature. Contract calls for three years' agreement, asks installation of electrical pumping apparatus at power plant instead of steam, and has other features which safeguard city.

Springfield, Ill.—Mayor Schnepp's ordinance for purchase of generator and boiler for plant at Tenth and Reynolds Sts. has been passed.

Hartford City, Ind.—Committee of merchants have appeared before City Council and petitioned for electric lights at alley intersections around public square.

Indianapolis, Ind.—Additional electric arc lights have been ordered for various streets.

Minden, Ia.—Citizens of Minden have petitioned Mayor and Town Council asking that election be called to vote on proposition of erecting electric light and

power plant and of issuing bonds not to exceed sum of $7,000 to pay for it. At regular meeting council authorized Mayor to issue proclamation for election on second day of January, 1914.

Holyrood, Kan.—Installation of electric lights is being considered.

Topeka, Kan.—Plans are being formed by the residents and business men in North Topeka to start movement to extend white way from Gordon St. to Garfield Park.

Whiteburg, Ky.—W. E. Kilgore and others of Wise C. H., Va., have been negotiating with people of Whitesburg for establishment of electric light plant and water works here.

Dover, N. H.—One section of Dover will shortly be ushered into coveted "gay white way" column as merchants of Third St. have guaranteed to finance proposition whereby three arches will span this section of city on each of which will appear hundreds of incandescent lamps.

Elizabeth, N. J.—Installation of better lights along main business street is advocated.

Long Branch, N. J.—Extension of "white way" for Broadway is planned.

Tonawanda, N. Y.—City will shortly have new lighting system in business section.

Tarboro, N. C.—At regular session of Town Commissioners board authorized Mayor Paul Jones and R. B. Proctor to secure all data possible on feasibility of municipal gas plant for Tarboro.

Dauphin, Pa.—Improvements to lighting system are being planned.

Johnstown, Pa.—Mayor recommends erection of municipal light plant.

Lebanon, Pa.—A fifty year franchise granting to Lebanon Valley Electric LightCompany, known as Weaver interests, permission to enter city and erect poles and string its wires, was subject of ordinance introduced at meeting of City Councils. The bill will be known as Bill No. 9.

Philadelphia, Pa.—Rejecting bid of Welsbach St. Lighting Company for 20,000 gasoline lamps next year, Director Cooke will readvertise contract, using specifications employed this year.

Pittston, Pa.—At lengthy session of City Council ordinance granting franchise to Pittston City Electric Co. (now known as the Citizens' Electric Illuminating Company) was adopted on third and final reading.

Greenville, S. C.—Appropriation of $13,800 has been asked for street lighting in 1914, to include installation of number of new lights.

Orangeburg, S. C.—Council will sell bonds in sum of $60,000 for light and water purposes early part of January.

Niagara Falls, Ont., Can.—City Engineer Anderson is making survey of River Road preliminary to installation of ornamental lighting system. He will submit tentative plans for system to City Council at its next meeting. Lights will be placed along River Road, from Ferry Hill to Butterv Ave., at intervals of 100 feet. Standards will be similar to those in Falls and north Main St. across river. Installation will cost about $18,000.

CONTRACTS AWARDED.

South Bend, Ind.—Ordinance awarding contract for lighting of ctiy of South Bend to Indiana & Michigan Electric Co. has been passed by Common Council. Contract is for ten years, beginning Jan. 1, 1915. Figures in contract ratified were same as those in original bid. The 7½-ampere alternation current series arc lights, same as are in city now, underground construction, will cost $78 a light a year and overhead lights will cost $62.75. Price South Bend is now paying to same company for lights is $95 a light a year, underground construction, and $78.75 a light for overhead construction. These contract prices are on 400-light basis. Contract includes figures on other kinds of electric lights, varying as to amperage, current and style, in case city should wish to change from present lighting system. Contract involves about 50,000 annually for lighting.

Bagley, Ia.—For constructing municipal electric light plant, to Globe Electrical Co., of Milwaukee, Wis., at $5,325.

Corry, N. Y.—John S. Rogers, of this city, has secured contract for installing big 1,200 lamp power storage battery equipment for Sherman lighting plant.

FIRE EQUIPMENT

Grass Valley, Cal.—The local firemen, headed by Chief Engineer C. R. Clinch, will ask city to issue bonds for additions to apparatus of Fire Department to include new auto fire truck.

San Francisco, Cal.—Contract for building engine house No. 48 at 22d and Wisconsin Sts., to Newson, Wold & Kohn at $29,555.

Wilmington, Del.—Fire Com. has been authorized to confer with Police Comrs. regarding installation of improved system of fire alarm boxes in city.

Atlanta, Ga.—Erection of fire station in Eighth Ward is being considered.

Boston, Mass.—Council has passed loan order for $125,000 for new fire alarm equipment.

Charlotte, Mich.—A motor combination chemical and hose wagon may be purchased.

Saginaw, Mich.—A six-cylinder Hudson auto will be type and power of machine which chief of fire department will purchase in near future.

Neligh, Neb.—Purchase of one piece of motor apparatus is being considered.

Nashua, N. H.—Bd. of Fire Comrs. has given notice to both bodies that committee in near future would ask for appropriation for motor-driven combination wagon for Fire Dept.

Long Branch, N. J.—Establishment of fire and police telegraph system is being planned.

Millville, N. J.—Installation of fire alarm system is being discussed; also purchase of new chemical engine.

Perth Amboy, N. J.—A communication from McClellan Engine Company asking for a new hose and chemical wagon, etc., has been received and referred to Committee on Fire.

Roselle, N. J.—By resolution offered by Councilman Warner, Chairman of Finance Committee, at meeting of the Borough Council sale of $10,000 bond issue for purchase of motor fire apparatus was authorized. Purchaser was Nathan R. Leavitt, of Elizabeth.

Rumson, N. J.—Taxpayers have voted in favor of purchase of new apparatus.

Trenton, N. J.—By substituting gasoline tractors for seven horses to draw engines of fire companies, Commissioner La Barre believes city can save $2,000 a year. Tractors will be purchased as soon as proceeds from $34,000 bond issue for Fire Department purposes are realized. The ordinance providing for bond issue has been introduced. Department of Public Safety is contemplating three-wheeled tractor wheels being set after plan of a velocipede, but uniform in size. Ordinance also provides for purchase of combination hose wagon for Engine Company No. 2, which now has horse-drawn hose wagon. With tractors and new motor hose wagon, services of seven horses will be dispensed with. Balance of proceeds from bonds will be used to cover cost of purchasing new house site for Engine Company No. 2 on South Broad near Second St., and to pay expense of building new house.

Trenton, N. J.—Ordinance has been passed to authorize issuance of bonds in sum of $34,000 for purpose of purchasing lands and erecting firehouse thereon for use of Engine Company No. 2, and equipping same; and also $4,000 for purpose of purchasing apparatus and appliances for, and making repairs to, Engine No. 3. Frank Thompson is City Clerk.

Bridgewater, N. Y.—Modern fire equipment is being considered.

Lestershire, N. Y.—Purchase of combination hose, ladder and chemical automobile is being discussed.

Mamaroneck, N. Y.—Village Board has voted to proceed with erection of new fire house for Volunteer Hose Company.

Middletown, N. Y.—Thursday, January 8, from 2 o'clock in afternoon until 8 o'clock in evening, has been selected as date for special election of taxpayers of city, on matter of voting for expenditure of $8,500 for purchase of chemical combination pump for Wallkill Engine Company, No. 6, by Common Council.

Middletown, N. Y.—Purchase of automobile apparatus to cost $8,500 is urged by the Waalkill Engine Co.

Waterloo, N. Y.—Board has ordered Finance Committee to purchase 600 feet of new hose, and to distribute it among various companies.

Tarboro, N. C.—At annual election of officers of Tarbaro Fire Dept., it was decided to purchase racing wagon of latest design to compete in State tournament this year.

Halifax, Pa.—Erection of new fire house is being discussed.

Reading, Pa.—Purchase of tractor for big truck of Keystone Fire Company has been authorized.

Wilkes-Barre, Pa.—Preparations are being made by city clerk to advertise for bids for purchase of automobile for chief of the fire department.

Wilkes-Barre, Pa.—Purchase of tractor for No. 6 Company engine truck is being considered.

Wilkes-Barre, Pa.—Motorization of Fire Dept. is under consideration.

Hendersonville, S. C.—The Hendersonville Fire Company has been authorized by City Commissioners to purchase additional equipment in way of helmets, respirators, coats, etc. Company was recently reorganized and fire bell installed. A modern electrical fire alarm system is now under consideration for Hendersonville.

Corsicana, Tex.—Purchase of up-to-date auto fire engine has been authorized.

Galveston, Tex.—Citizens have voted in favor of six bond issues aggregating $900,000, of which $75,000 is for fire boat.

CONTRACTS AWARDED.

Richmond, Cal.—Contract for erection of new fire hall for Company 2 to be erected on 5th St. has been awarded by City Council to Contractor Paul Glazer the lowest bidder at $11,846.

Jersey City, N. J.—Among most important contracts awarded was one to La France Fire Engine Co. for new fire engine drawn by tractor engine and for combination fire hose wagon of latest style. Company will provide fire engine for $9,000 and hose wagon for $1,000. Bids for the combination hose wagon were Combination Ladder Co., $1,649; Peter Persch & Co. of Winausha, Wis., $1,599 American-La France Co., $1,000. Bids for fire engine with gasolene tractor were: Amoskeag Steam Fire Engine Co. of Providence, R. I., $9,500; Ahrens Fox Fire Engine Co., $9,250; Front Dry Motor Co. of Hoboken, $9,000; Woodhouse Manufacturing Co. of New York, $8,400; Combination Ladder Co., $9,200; American-La France Co., $9,000.

Columbia, S. C.—By city, for following motor fire apparatus: Seagrave Co., one 75-ft. aerial hook and ladder truck; Robinson Fire Apparatus Co., one Robinson Monarch pumping engine; La France Co., one Type 15 pumping engine.

BRIDGES

Lafayette, Ind.—After conference with county attorney, County Auditor George W. Baxter sold to E. M. Campbell Sons & Co. of Indianapolis the $260,000 worth of bridge bonds issued by Tippecanoe County. Price paid was $268,788.

Des Moines, Ia.—Resolution of necessity calling for construction of sixty-three concrete bridges and culverts in Polk County during 1914 will be passed by Polk County Board of Supervisors. To carry out plan of board for providing more than half hundred new bridges next year a $100,000 bond issue will be made. If sixty-three bridges are constructed according to plans practically entire road system of the county will be bridged by concrete structures. One of big bridges planned for next year is 90-foot span with two 20-foot approaches across Beaver Creek on the Hyperion Road. This will cost $8,000. Another is two 42-foot spans over Four Mile Creek near Berwick. It is estimated that total cost of proposed work will be $101,000.

Richfield, Kan.—Comrs. have met for purpose of taking final action on bridge proposition across Cimarron River and to proceed to advertise for bids for construction of two bridges.

Lawrence, Mass.—Central bridge commission will discuss advisability of deciding on bridge 60 or 80 ft. wide.

Northampton, Mass.—A special City Council meeting has been held and important action was order authorizing Mayor to petition Legislature for construction of new Connecticut River bridge, County Commissioners to have charge of construction and future maintenance of bridge, the payments to be in old proportions, the county 11-25ths, Northampton 7-25ths, Hadley 4-25ths and Amherst 3-25ths. Order passed the upper board without opposition, but in lower board was amended so that Legislature could authorize extraordinary repairs in place of new construction.

St. Paul, Minn.—Co. Comrs. have sent plans to War Dept. for bridge across Ohio River between McKees Rocks and Woods Run. New plan sent to War Dept. calls for main span of 850 ft. Comrs. say they have found many bridges with spans much shorter than this. They say that span of 1,300 ft. long would cost $1,000,000 more than the 850-ft. span.

Gulfport, Miss.—Supervisors of Harrison County have decided to advertise for bids for three new bridges which will be built within next few months. One will be steel bridge five hundred feet long over Wolf River and two hundred foot bridge will be constructed